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Rapid Rises in B.T.C. Costs

THE increases in the costs of materials and wages of the British Transport Commission over the first three years since nationalisation are shown in the report for 1950, discussed elsewhere in this issue. This also shows the increased annual cost resulting from continued rises in costs of materials and wages over the first four months of 1951. These total some £28·6 million—a formidable amount even against total outgoings of some £500 million. Increases in the cost of materials include a rise last February in the price of coal, which cost £3·3 million a year, and the April budget increase in the duty on petrol and fuel oil, which involved additional expenditure of £3·2 million. Another major item was £2·5 million for the higher price of softwood, in February. The smaller items, such as £400,000 for dearer iron and steel in February, add up to a considerable total—and tend to recur. Wage increases accounted for over half the total increase in costs; the largest item was £14 million for the increases for railwaymen granted in February and back-dated to the New Year. What further wage increases are to be expected in the near future is problematical; in view of recent resolutions by the railway trades unions a concerted demand for increases seems imminent. A factor in the consideration of railway wages (by far the biggest item in the Commissions wage bill) is the emphasis now placed on the level of wages on the railways in contrast with other industries in the light of a drift of workers away from the railway. This is additional to consideration of the wage levels in relation to rising prices of consumer goods. Against the increases in the costs of its materials and wages, the B.T.C. so far this year has asked for and obtained the interim freight rate increase of April, expected to bring in £20 million over a full year—or perhaps £12-13 million this year, and has lodged the 1951 Passenger Charges Scheme, which should produce £17 million over a full year, but is unlikely to be in operation till the autumn. In addition, many real economies are being effected. Whilst it is too early to say what the result will be, there are prospects of a reduction in the deficit.

Mr. Archibald Campbell

AMONG their various functions the Crown Agents for the Colonies act as Consultants and Inspecting Engineers to the Colonial railways, as well as to certain other systems elsewhere in the Commonwealth, and particular interest centres on the honour of C.B.E. recently conferred on Mr. Archibald Campbell, Chief Mechanical Engineer to that Office. In this position Mr. Campbell acts as a liaison between the Colonial railways and United Kingdom manufacturers on all matters concerning the design and ordering of railway rolling stock and machine tools. He therefore gives special assistance in the promotion of good trade relations with the Colonies and he has always been closely in touch with the technical officers of Colonial railways and with developments on their systems. In connection with his office Mr. Campbell has travelled widely, as will be seen from his biography elsewhere in this issue, and he has played an important part in keeping the Colonies well acquainted with advances in design and construction in the United Kingdom.

Marshall Aid for Rhodesia Railways

APPROVAL of a loan by the United States of up to £5,000,000 to assist the present programme of the Governments of Southern and Northern Rhodesia for the improvement of the Rhodesia Railways has been announced. The loan will be repaid to the greatest extent possible in raw materials in which the U.S.A. is deficient, such as cobalt, copper, tungsten and chrome, from Southern and Northern Rhodesia mines. The loan agreement will be between the Economic Co-operation Administration, representing the United States Government, and the United Kingdom, on behalf of the Governments of Southern and Northern Rhodesia. Under terms of the agreement, Southern Rhodesia is to guarantee fixed quantities of monthly deliveries of coal to the Northern Rhodesia copper region from the Wankie collieries to facilitate mining operations. Most of the amount of the loan will be spent on locomotives and rolling stock, and many orders have already been placed in the United Kingdom. It will be remembered that the E.C.A. is undertaking, jointly with the Colonial Office, and with the participation of the Northern Rhodesia and Tanganyika, a second intensive survey for a connection between the Rhodesian and East African railways, as previously referred to in these columns.

The I.C.C. and International Traffic

THE International Chamber of Commerce has long been pressing for representation at the meetings of the Central Office for International Railway Transport, at Berne, which latter body is responsible for the Conventions, C.I.M. and C.I.V., regulating international goods and passenger traffic respectively. Recently the I.C.C. was invited, with the concurrence of the Governments represented in the Central Office, to attend meetings in a consultative capacity, and already this year has attended amongst others the meetings on international goods traffic at Montreux and on containers at Zurich. The Chamber's views have been set out in a document on the revision of the Berne Conventions, which has been distributed to the various Governments, and some of its suggestions have been adopted. Besides this more general representation of the railway users' viewpoint, the I.C.C. is doing useful

work in the matter of privately-owned wagons by ensuring permanent liaison between all concerned, including users, owners, and builders of wagons, the railway administrations, and the competent railway and other international associations. The resultant joint recommendations are being considered in the establishment of new regulations which promise to be more satisfactory for owners or users of privately-owned wagons than those now in force.

Overseas Railway Traffics

THE advance in working expenses of the Canadian Pacific Railway during May exceeded an accompanying improvement in gross earnings, and as a result there was a £455,000 decline to £347,000 in net earnings for the month. Gross earnings at £12,462,000 were up by £1,788,000 and working expenses, which amounted to £12,115,000, were £2,243,000 higher. On the aggregate, though, C.P.R. net earnings have advanced by £1,346,000 to £3,249,000 and gross earnings for the current 22 weeks at £56,846,000 compare with £48,328,000 for the equivalent period of 1950. Aggregate net revenue of the Canadian National Railways at the end of May amounted to £4,905,000 and was higher by £1,592,000, though there was a £403,000 decline in net revenue for the month of May. During the four weeks under review operating revenues rose by £1,809,000, and operating expenses advanced by £2,212,000 to £15,944,000. Midland Railway of Western Australia traffics improved by £8,060 to £41,036 during April and for the current 43 weeks have increased by £89,683, at £398,533.

Easing U.S.A. Mountain Gradients

MANY of the U.S.A. main lines laid years ago through mountain areas were built when speed in the completion of communication was the primary consideration. Builders had no idea of the demand that loads and high speeds eventually would make. The main line of the Atchison, Topeka & Santa Fe Railroad, with its four summit levels exceeding 7,000 ft. and its 1 in 28½ eastern approach to the 7,617 ft. altitude of Raton Summit, is a case in point. This compares with the Western Pacific, which was not opened until 1909, and managed to engineer the whole of its 116-mile climb through Feather River Canyon on a gradient no steeper than 1 in 100. Much is being done today to improve these routes. The latest application to the Interstate Commerce Commission for authority is one by the Union Pacific Railroad, which operates high-speed passenger trains and a very heavy freight service over Sherman Summit, west of Cheyenne, Wyoming; this is 8,013 ft. above sea level. The project involves a new westbound line, 42 miles long, from Cheyenne to Dale Creek, which would reduce the ruling gradient from 1 to 64½ to 1 in 120, and the sharpest curves from 22 to 37 ch. radius. With the 540-ton " Big Boy " 4-8-8-4 freight locomotive now in use all double-heading westbound will be eliminated.

Electric Locomotive Wheel Notation

DISCREPANCIES between systems of expressing electric locomotive wheel arrangements are recalled by a recent article in the French railway journal, *Chemins de Fer*. This dealt in particular with the recommendations of the Central European Railways Association, which differ most notably from the practice general in this country by using an apostrophe instead of a hyphen after the symbols representing the axles of a bogie. On this principle a locomotive with two-axle motor bogies becomes a Bo'Bo' instead of a Bo-Bo. The hyphen is reserved for indicating articulation between bogies, and the *plus* sign, which is more familiar for this purpose, is applied instead only to locomotives consisting of articulated units with individual cabs. In representing a bogie such as the S.L.M. Combination type, which accommodates both a guiding axle and a driving axle, the apostrophe is placed after the guiding axle just as if it was carried in a separate truck. For example, the Netherlands Railways mixed-traffic locomotives would be designated 1'Do1' in this system, and not 1A-Bo-A1 as is seen sometimes. These variations emphasise the necessity of standardising practice if electric locomotive wheel notation is to achieve its purpose of conveying essential details without ambiguity to readers in all countries.

Traction at 50 Cycles

ELSEWHERE in this issue is published the concluding article in a series on single-phase electrification at 50 cycles, which has been specially contributed by Messrs. Marcel Prot, Chief Transport Engineer in the French Ministry of Public Works, and Louis Armand, Director-General, French National Railways, and translated by Mr. T. H. Vischer, European Sales Manager, J. Stone & Co. Ltd. The first of these articles appeared in our June 15 issue. The authors show how hindrances to the development of electrification using current at the industrial frequency have been overcome, and the saving in materials and cost which will result from its installation. Since the article was written it has been announced that the French Railways are to extend the Aix-les-Bains—La Roche-sur-Foron 50-cycle electrification as far as Annemasse, some four miles from Geneva, and also to St. Gervais-les-Bains-le-Fayet, whence a mountain railway leads to Chamonix (for Mont Blanc) and Vallorcine; this will add some 65 miles to the existing 78 route-miles electrified at 50 cycles. We are informed that the Oerlikon-equipped Co-Co locomotive working on the La Roche-sur-Foron line has now covered under difficult conditions over 62,000 miles without trouble.

Rolling Stock for the Gold Coast

TO make up leeway in the replacement of rolling stock which could not be effected during the war, and to cope with increasing traffic which can be expected as a result of developments taking place on the Gold Coast Railway, the Crown Agents for the Colonies placed orders for the supply of rolling stock with the Gloucester Railway Carriage & Wagon Co. Ltd. The developments, which include the doubling of the 42-mile section of the line between Takoradi and Tarkwa, were described in our August 26, 1949, issue. The order comprises upper class composite coaches and third class coaches of all-steel construction and integral design, the stock being arranged with end open platforms. The railway administration is converting all existing rolling stock to MCB couplers, and the drawgear on the new rolling stock has been equipped with a transition casting on the front of the knuckle coupler, which also incorporates a draw hook and is cast integrally with it; screw couplings are also provided. The conversion will take several years, and will be carried out on a programme basis.

Feed-Water Heating

ONLY war conditions, calling for quick production and austerity in regard to materials and labour, put a stop to feed-water heating for new construction in Germany. The thousands of prewar locomotives with closed-type feed-water heaters across the front of the smokebox continued to run with the apparatus in full function, and only the *Kriegslokomotiven* of classes 50 U.K., 52, and 42 were built without them. Even the last-named class was not entirely immune during the war years, and at least two were equipped, one with the Knorr type and the other with the Heinl. But both of these were of the open, or mixing pattern (*mischvorwärmer*), a departure from German prewar practice, and one in which exhaust steam from cylinders and auxiliaries is led into the feed water. Despite maintenance difficulties and the large number of locomotives still awaiting heavy repairs, saving of coal and easing of boiler conditions is leading to renewed attention to pre-heating boiler feed water in Western Germany, and at least one closed and two open types, each by a different maker, are under trial on large locomotives. Maintenance of a level high temperature of the feed water at delivery to the boiler has not always been easy with the mixing type, and some of the tests are being concentrated on rectification of that fault.

Third Year of State Transport

GREATER rapidity in preparation and publication, compared with the two preceding annual reports, is a marked feature of the British Transport Commission Report for 1950, of which some details are given on other pages; the report has appeared two months earlier in the year than hitherto, and the accounts were certified at the end of May, which, in view of their complexity, is reasonably expeditious work. It is gratifying that the Commission's deficit has been reduced to £14·1 million from the £20·8 million to which it had grown at the end of 1949, during which latter year it advanced, largely as the result of rising price and wage levels, from £4.7 million for the previous year. The total deficit at the end of the year was some £40 million, which is small in relation to the turnover of some £500 million. The estimate for 1950, drawn up in May of that year, was of a £15 million deficit. As the report points out, it might have been avoided altogether if there had been a continuation of the conditions which obtained towards the end of last year, when the Commission was almost paying its way. Rapidly rising costs, including wage increases upset this equilibrium, and this has continued into the current year. The extent of the increase in annual costs is shown by figures since nationalisation. In 1948, increases totalled £16·2 million, in 1949 £2·5 million, and in 1950 £11·2 million, the last including £5·7 million for the increased duty on petrol and fuel oil for road vehicles in the April budget that year. This compares with £28·6 million in respect of the first four months of 1951. The report rightly points out that no part of the deficit for 1950 is borne by the general taxpayer. Transport users hitherto have received services at less than cost price, and future transport users must pay the difference; since nationalisation the former have had the benefit of low interest charges on capitalised net values with nothing put aside for replacing assets.

The B.T.C. has taken active steps to adjust its charges within the limitations imposed by statute. The interim freight rate increase of April last, with the fare increases envisaged in the 1951 Passenger Charges Scheme—if the latter is approved and in operation this autumn—may go far to reduce the deficit for 1951 to less than £14 million; but costs of materials are still rising, and there is no hope of the Freight Charges Scheme coming into force this year. It is clear from the report that lack of expedition, due to the inflexibility of the existing procedure for adjusting rates, has caused great loss of revenue to the Commission. The B.T.C., the report explains, is unique among commercial enterprises in its inability to increase its charges except through a lengthy process akin to litigation, with serious losses when costs rise or traffics decrease. The report asks for a more flexible procedure, but makes no definite proposal. It should surely be possible to devise machinery which is expeditious and affords a greater margin of discretion to the Commission, and yet allows for some degree of outside control: the latter, in any event, will always to some extent be exercised by public opinion.

In a reference to the Central Charges, the report states plainly that these, or at least the interest element in them, are a form of cost and in no sense an appropriation of profit. They must be met out of what can reasonably be secured from the Commission's several activities. The fact (the report adds) that they are not apportioned does not mean that the source is immaterial. The B.T.C. endeavours to maintain a "clearly articulated" financial structure which will avoid the evils of indiscriminate pooling and demand from each activity an amount depending on circumstances. Thus "on any reasonable basis of expectation" the Commission ascribes the deficit for 1950 to shortfalls in contributions from most of its major activities except provincial and Scottish buses—where comparatively quick fare adjustments were possible with the more flexible procedure under the licensing authorities.

The insufficiency of the capital expenditure permitted by the Government to the B.T.C. is emphasised. Despite the recent statement by the Chancellor of the Exchequer, that there would be greater capital expenditure in 1951 on certain public utilities, including railways, the situation is not clear though an increase in terms of work done is apparently to be expected. The report describes some of the dire consequences of restricted development and suggests "a more adequate allocation of the total amount available for national capital investment." The present patching of plant overdue for replacement is rightly described as extravagant. Improvement in efficiency depends largely on long-term measures of re-equipment and reorganisation. One such measure, is electrification "in suitable circumstances." The report of the Electrification Committee, discussed in our March 23 issue, has been approved by the Commission, as has the Railway Executive scheme for electrification of the Tilbury line.

Of the many British Railways matters mentioned in the report one of the most interesting is the disclosure of a purchase from the French National Railways of some 9,000 all-steel mineral wagons of standard British design built by British contractors at the end of the war. The wagons should be a useful addition to British Railways mineral wagon fleet in which there have been local shortages in recent months. Good progress was made in the use and development of containers, including specialised types. Regarding palletisation, despite the many experiments and perfection of equipment, the report states that traders were not disposed to send pallets by rail. The closing of unremunerative branch lines and stations resulted in savings of only £350,000 during 1950. Although the process is being accelerated, it can never result in the scale of economy its many supporters allege. The report contains some trenchant observations on the relative efficiency of rail and road transport and on rates and fares. The recent increases in railway freight rates are justified in the light of traffic returns, though increased industrial productivity and diversion of traffic to rail by reason of higher road charges are admitted to be possible contributory factors. The case is lucidly stated against general reduction in passenger fares; the report advocates reduction only in "particular and carefully selected cases."

Railway Unions' Relations with Managements

IN our last week's issue we referred briefly to the Presidential address by Mr. H. W. Franklin at the annual general meeting of the National Union of Railwaymen at Hastings. Mr. Franklin had a good deal to say about relations between management and labour. Some of it was the more valuable because it would not be most acceptable to the rank and file. He said that often it was easy to be critical of those holding high administrative posts, and to imply that the workers either could do the job better themselves or find among their own ranks others who could satisfactorily replace the people in authority. He was not sure that this was so, for the technique of management was not easily to be learned. He went on to advocate that the unions should concentrate on securing specialised training for a greater number of its young members so that the higher official positions would be open to them and that they would have the capacity successfully to undertake responsibility and to formulate policy.

He added, however, a proviso, of which probably he did not appreciate the full implications. He said: "In addition, I feel that no one should be given any of the higher administrative posts in State-owned industries unless the appointing authority is satisfied that he sincerely believes in the policy of State-ownership." Here, indeed, is a tenet of "jobs for the boys." Is the sincerity of belief in State ownership to be weighed in the balance against technical, administrative, or other suitability for the position when an appointment is being made? Mr. Franklin's suggestion has been made before, but to implement it would be to introduce an entirely new factor into democracy as it is understood in this country. It would be one step on the road to the Communist principle of issuing ration-books only to members of the party. Would Mr. Franklin subscribe to the reasonable corollary that no member of the Socialist party who believes in State-ownership should

accept employment in an avowedly capitalistic private enterprise?

Presumably the N.U.R. President's edict is based on the assumption that the Minister or other authority making these appointments will always share his political beliefs. In the event of the Conservative party being returned to power in this country at some future time, would he consider it reasonable if the then Minister stipulated that no appointment should be made to the board of a nationalised industry of any applicant who professed belief in State control? Management of any large undertaking, particularly those which have resulted from nationalisation measures in recent years, is too onerous and too complex to permit of the introduction of purely idealogical considerations of this kind. The essence of their conduct should be successful commercial operation; if it is not, the nation itself will be the sufferer.

Mr. Franklin also had something to say on the interest charge of £34 million a year payable on British Transport Stock. He said that, in conjunction with the other railway unions, the N.U.R. was making joint efforts for a thorough examination into the financial structure of the British Transport Commission with a view to a joint policy being approved for submission to the Government to lessen the burden of interest charges on the industry. The Trades Union Congress was also making an examination into the financial structure of State-owned industries in general. Having said that the union could not contemplate that for all time the industry would have to bear the interest charge, he added rather naïvely, that, unless the financial burden was eased, the men would be handicapped by the deficits shown on the Commission's annual accounts whenever they sought a revision of the wages structure.

So far, the nationalisation projects which had been put through in this country have avoided the principle of outright confiscation, although we remember that some classes of railway stockholders did not consider their treatment by the Government as generous. But it is a new idea in this country, at least, to eliminate all capital charges on the nationalisation of an undertaking. This, indeed, would be a means of getting rid of "the legacy of the past"—a past, by the way, which enabled these industries or undertakings to be established and brought to a sufficient condition of essentiality to the community to make them worth acquiring by the State. If the slate were wiped clean of capital charges at the present time, would the British Transport Commission at some later date be able to raise funds for any developments which it might wish to put in hand, or would the public fight a little shy, because it feared that some more slate-wiping might be done in the future? Public confidence in financial integrity is not quite so unimportant from a practical viewpoint as Mr. Franklin may believe.

Pre-Stressed Concrete Structures

A PAPER dealing with pre-stressed concrete as applied to the construction of railway bridges and other works, was submitted by Mr. A. Dean, formerly Chief Officer Engineering (Works), Railway Executive, and now Civil Engineer, North Eastern Region, British Railways, to the Institution of Civil Engineers on May 8. The author explained that its presentation "was undertaken deliberately as a non-expert presentation of certain considerations arising from the use of pre-stressed concrete by the practising engineer in the railway field and as a report of progress made in that field on British Railways." He also points out that no rigid application of any one particular pre-stressing technique is made by them.

The paper outlines the financial and other reasons for exhaustive investigation by the Railway Executive into the merits and possibilities of pre-stressed concrete design and construction. It has the advantage of (1) saving costly steel, (2) permitting of relatively shallow depth of construction — often a matter of vital importance in the United Kingdom—and (3) almost certainly ensuring low maintenance cost. On the other hand, there are several uncertainties regarding margin of safety, notably against failure due to repeated loading in the case of short-span railway underbridges.

The first pre-stressed concrete underbridge built on a British railway in 1946 was the Adam Viaduct, consisting of four spans of 29 ft. each composed of 16 pre-cast beam units pre-stressed on the Hoyer system; so far, this bridge has been entirely free from troubles. Subsequent pre-stressed bridge developments on British Railways have taken the form either of (*a*) simple pre-cast slab and beam units, (*b*) pre-cast floor slabs for use with steel main girders to provide a shallow form of construction, or (*c*) pre-cast channel-type units for single-track bridges, site assembled and post-stressed to form bridges with completely composite main beams and floor. The construction depths of type (*a*) vary from 10½ in. in a 9 ft. 6 in. span to 1 ft. 11 in. in a 25 ft. span. For convenience in crane handling and to conform to a 23-ton weight limit, short-span units are generally 5 ft. 7 in. wide, and those for longer spans 2 ft. 9½ in. wide.

Various designs of structures for up to 40 ft. span are described and illustrated by drawings in the paper, as are also designs for structures of types (*b*) and (*c*), and for composite construction road overbridges. In the latter connection a comprehensive graph is included showing the results of static loading tests on a 26 ft. 6 in. span. Arrangements are being made for repeated-loading tests on beam units to be carried out.

The practice followed by British Railways in pre-casting and pre-stressing bridge units is described in some detail. The pre-stress is applied and the cables anchored seven days after casting. The high-tensile steel wire used has a nominal diameter of 0·2 in., and is specified to have a breaking strength of 90-100 tons per sq. in., with a 0·1 per cent. proof load of 70 per cent. of the breaking strength. As this wire is now available in 6-ft. dia. coils, no straightening is required. The cables so far used consist of 12 wires assembled round a 16-S.W.G. coiled core, latterly bound with soft wire and adhesive tape. Ductube is now used in conjunction with Freyssinet anchor cones in concrete beams. A simple arrangement for combining the fixing of the anchor cones and Ductubes is illustrated. The jacking load at which the wires are locked gives an average stress of something like 70 tons per. sq. in. in the wire. In the case of short slabs the cables are tensioned from one end only.

Apart from bridgework, the two main fields of application of pre-stressed concrete are in the construction of steam locomotive and other shed roofs, and of platform roofs or awnings. Concrete can be a satisfactory material for engine shed roofs if high-quality material only is used, and so long as it is not subjected to direct locomotive blast. Comparisons of costs of steel, reinforced concrete, and pre-stressed concrete running shed roofs indicate the latter as the most economical today, and this advantage is likely to be enhanced by lower maintenance costs. Designs so far developed for such roofs have long-span pre-stressed main roof beams carrying simple secondary beams and roof members.

For platform roofing a single cantilever awning is being designed using pre-cast pre-stressed columns, beams, and thin slab units, with post-tension connection made at site between beam and column. For wide platforms, pre-stressed concrete roofs are economical, and the following are the principles laid down for their construction: (1) the height of the roof over platform edges should be the minimum allowed by standard fixed and running dimensions, (2) over "a substantial width of the platform" "reasonable loftiness" should be provided, (3) glazing should be provided and be easily cleaned, and (4) the minimum number of columns should be used.

It will thus be seen that, though no spectacular developments in the use of pre-stressed concrete are taking place on, or contemplated by, British Railways, the matter is constantly under consideration and being thoroughly investigated. Much depends on the realisation of expectations with regard to long-term economy in maintenance which time alone can confirm.

Western Australian Government Railways

WE have received from Mr. A. G. Hall, Commissioner of Railways in Western Australia, a copy of the administration report for the year ended June 30, 1950, on the Government Railways of that State. The system at that date had a length of 4,252 miles of main line or route-mileage, a decrease of 69 miles over the previous year, accounted for by the dismantling of the last section of the Mt. Magnet-Sandstone line. Other 1949-50 figures and the corresponding ones for 1948-49 are given below:—

	1948-49	1949-50
Mileage open	4,321	4,252
Train-mileage	7,181,147	6,733,141
Passenger-journeys	12,979,098	11,671,655
Goods ton-miles	333,524,755	426,358,732
Average staff employed	10,865	11,364
	£	£
Passenger receipts	1,237,304	1,347,148
Goods receipts	3,634,680	4,750,368
Miscellaneous receipts	342,860	374,533
Total receipts	5,214,844	6,472,049
Working expenses	6,702,254	7,501,395
Working deficit	1,487,410	1,029,346
Interest charges	1,063,023	1,093,147
Final deficit	2,550,433	2,122,493

This improvement of £428,000 was due to three main factors: increased freight tonnage, longer haul, and higher rates and fares. The tariff increases were 20 per cent. in September, 1948, and a further 7½ per cent. in August, 1949. Passenger journeys fell considerably, and this was the combined result of the coal strike, the cessation of liquid fuel control, the greater number of new motorcars available, and the inroads permitted to be made by private bus services into legitimate railway business. Considering the curtailment of services during the coal strike, the increases of 106,572 in goods tonnage and 32,833,977 in ton-mileage are particularly noteworthy, and the total ton-mile for the year was an all-time record by over 10 million. Provision of additional bus services in country districts enabled engine power to be diverted from passenger to goods service, and the longer average haul improved wagon turn-round. On the other hand, continued drought necessitated an extensive haulage of water, militating against the maximum use of the resources of the railways.

The higher cost of working in 1949-50 is accounted for by the steep rise in the basic wage and awards—by £2,064,000 since 1938—in the costs of stores and materials, and in the costs of pensions and holidays, and due to the 40-hr. week. Maintenance of way and works alone cost over £272,000 more than in 1948-49, and transportation and traffic £141,000 more, £117,000 of this figure representing salaries and wages. Maintenance costs were abnormally high, especially in connection with the great number of over-age locomotives and rolling stock vehicles, and heavy expenditure was necessary if the railways were to be saved from complete collapse.

An important point made in the report is that the system is, and always has been, largely developmental, and that the economy and progress of the State are dependent to a far greater degree on its efficient working than is generally realised. If the railways are to balance their budget, they should be divided up into two main categories, commercial and developmental. The commercial lines are those that might be expected to pay their own way, whereas developmental sections should be directly subsidised by the State. This is the sound principle on which the North Western Railway in British India was administered, the railway on which Mr. Hall served for many years, latterly as General Manager. Regarding the tariffs in force on Australian railways, Mr. John Elliot, Chairman of the Railway Executive, after visiting Australia referred to "the bad principle of subsidising industry through ridiculously low rail rates, which has so hampered Australian railway administrations in keeping their systems reasonably well-maintained and equipped . . ." In Western Australia the Railway Department is subsidising the people and industry of the State to the extent of £2,000,000 a year.

In 1949, 73 per cent. of the locomotive stock was over the economic age of 30 years, and in 1950 the figure had slightly improved to 70 per cent., thanks to the receipt of 12 "PM" and 3 "PMR" class, and the writing off of 18 engines. During 1949-50 35 "PM" class were received from overseas. The order for "W" class light-rail locomotives was increased from 40 to 60 for delivery early in 1951. Six diesel-electric railcars and twelve trailers were completed during the year to form six 3-unit trains known as the "Wildflower" class. Despite labour and materials difficulties, engine-miles per failure increased from 12,000 to 14,320, and the proportion of engines in good order rose from 69 to 74 per cent.

Freight Movement on British Railways

(By a Correspondent)

DURING the four-week period to May 20 British Railways failed to recover the flexibility of movement reached in 1949 and 1950. Compared with the corresponding period of 1950, freight traffic decreased by 951,000 tons, or 4·2 per cent., and ton-miles by 33,524,000, or 1·9 per cent. Freight train-miles were down 4 per cent., and wagon-miles 3·9 per cent., leading to a reduction of 1·8 per cent. in train engine-hours in traffic. Conditions were in favour of mobility, but freight train speed was only 8·5 m.p.h., a fifth of a mile less than in 1950. The wagon-miles worked in a train engine-hour decreased from 237 to 231 and net ton-miles per train engine-hour from 1,140 to 1,132.

Articles in the June 1 and 8 issues showed how the poor results of the London Midland Region and Western Region were spoiling the statistics of the whole railway system. The table below contrasts the performance of these Regions in May with the figures for the Eastern Region.

PERCENTAGE VARIATION BETWEEN MAY, 1951, AND 1950

	Region		
	London Midland	Western	Eastern
1. Tons originating :—			
Merchandise	− 7·1	− 2·5	− 3·9
Minerals	+ 1·0	− 1·7	− 3·3
Coal	− 3·8	− 7·1	− 5·7
Total	− 3·3	− 5·1	− 4·8
2. Net ton-miles :—			
Merchandise	− 7·3	+ 0·5	− 0·6
Minerals	− 2·8	− 6·1	−13·5
Coal	− 0·2	− 0·3	+ 3·8
Total	− 2·9	− 1·5	− 1·7
3. Freight train-miles	− 6·9	− 1·5	− 4·4
4. Wagon-miles	− 5·7	− 0·1	− 4·6
5. Train engine-hours in traffic	− 2·3	+ 4·6	− 5·5
6. Net ton-miles per train engine-hour ...	− 0·7	− 5·7	+ 2·6
7. Wagon-miles per train engine-hour ...	− 4·0	− 4·6	− 0·3
8. Freight train speed	− 4·6	− 5·8	+ 1·2

The first four entries indicate that there was less work to do this year in all three Regions. The London Midland had the largest measure of relief, but reduced train engine-hours by only 2·3 per cent. compared with the Eastern Region cut of 5·5 per cent., while the Western increased its engine time by 4·6 per cent. The last three items in the table point to a continuation of slow movement in the Midlands and South Wales, whereas the Eastern Region effected the higher mobility, which one would expect to see in a period of diminishing traffic volume. Similarly, the North Eastern Region, with 6·7 per cent. less tonnage and 1·9 per cent. fewer ton-miles, worked nearly 3 per cent. more ton-miles in a train engine-hour and raised its train speed to 10·7 m.p.h. The Scottish Region had a smaller decrease in traffic volume, but attained the satisfactory train speed of 10·9 miles an hour.

The cure of the slow working on certain sections of line may prove to be a decisive test of the supposed advantages of railway unification. The loss of wagon user through traffic blocks on these sections impaired wagon supply in other districts, and a considerable amount of locomotive power appears to have done little effective work. The cost of working since December last would be excessively high in the congested areas. We are still without any clear announcement from the Railway Executive about the policy which it has adopted for remedying the situation.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Diesel Locomotive Traction

June 25

SIR,—In the editorial article "The Last C.M.E. of British Railways" in your June 22 issue, you speak appreciatively about Mr. Ivatt's initiative with regard to the large diesel locomotives built for the former L.M.S.R., and you wind up by saying: "Not the least value of these two projects has been the assistance which has been accorded in demonstrating British equipment to overseas buyers, many of whose representatives have travelled on the locomotives."

The same point was also stressed very forcibly by Sir Robert Burrows and Sir George Nelson on the occasion of the demonstration run of No. 10000 on December 18, 1947. Would it be impertinent to ask what reply is given by the representatives of the builders and of British railways when a prospective overseas buyer enquires something to the following effect: "If these locomotives have been giving such excellent service for over three years, how can it be that no more have been ordered by British Railways?"

Yours faithfully,
JAMES STEFFENSEN

Ehlersvej 8, Hellerup, Denmark

[One reason, no doubt, is the difficulty, with present British timetables, of obtaining the maximum availability from these locomotives over the relatively short runs and congested routes in this country.—ED., *R.G.*]

State of British Railways Rolling Stock

July 7

SIR,—This is Saturday evening and I have just finished a round of visits, lasting a fortnight, as one of the delegates of the International Conference of Naval Architects & Marine Engineers which was arranged to tie up with the Festival of Britain celebrations. Consequently it was one of the most important international conferences these two professional bodies have held. There were some 430 delegates, accompanied by their ladies, and they came specially from places as far away as Australia, New Zealand, and Canada.

There was a strong contingent (about 50) from the United States, and some 25 from France, 30 from Spain, ten or so each from Sweden and Norway, and many other representatives from Belgium, Germany, Greece, Holland, Italy, and so on.

We attended the first sessions for a week in London and in the evenings had hospitality extended to us by *Lloyd's Register*, His Majesty's Government at Lancaster House, by the Lord Mayor at the Mansion House, and from many other directions without stint. The overseas delegates were thrilled.

Then on Sunday, in accordance with an arrangement made with British Railways before Easter, some 170, mostly overseas delegates, were to proceed by special train from Euston to Glasgow and thereafter from Glasgow to Newcastle and thence from Newcastle to Kings Cross.

It was unfortunate that, perhaps through operational difficulties, the special train had to be drawn in to that depressing platform at Euston which has a row of dog kennels and stinks eternally of fish; our overseas delegates, arriving well ahead of time, had to stand there, and contemplate the empty rails until ten minutes or so before 9 o'clock when the train was due to leave.

That, however, was nothing to the horror which we handful of Britishers experienced as the train drew in. Looking back over many years, never have I seen on the cheapest excursion trains such a broken-down conglomeration of rolling stock to greet the overseas visitors. My table collapsed twice on the journey, injuring a lady's leg, and another also collapsed in my coach; no wonder, because the screws had no hold on the ancient wood. Fortunately in neither case was the soup being served.

These incidents were trivialities to the revolting state of the lavatories. The first one I went into gushed water over the pan and flooded the floor before I could escape. The second had an empty water-can in it—which was just as well as the tip-up basin outflow was choked. All this was before Watford, and I will spare your readers the tedium of my inspection of other toilets beyond saying that nowhere did I see soap or towels, and as we had to endure these conditions for ten hours (the train was late) these lavatories were in a state of gross insanitation.

We left Glasgow on Wednesday, and, in the two and a half days, there had been an attempt to clean things up and most toilets had a piece of soap and paper towels. Our travelling conditions therefore from Glasgow to Newcastle were more agreeable, although the plumbing was still defective, and in many cases unsuitable for the ladies.

The rolling stock awaiting us at Newcastle this morning was modern and clean, although there were no towels or soap. The restaurant service was excellent. Unfortunately, by then about half the delegates had elected to travel by road or in other trains, and were left with the hideous memory of that journey from Euston to Glasgow. Even their natural politeness failed to conceal their disgust, for, after all, most of them have their State railways which, I have invariably found, make special efforts to impress delegates at international conferences.

Yours faithfully,
JOHN P. TAYLOR

60, Kenilworth Court, S.W.15

Transport—A Liability for Ever?

June 30

SIR,—I note Mr. Dalton's letter in your June 29 issue. As he is not familiar with my proposals I have sent him a copy of my address to the Institute of Traffic Administration on June 2, 1950, the latest full-length exposition of them.

Meanwhile, my answer is that higher prices need not become higher costs if consumption of raw materials, and so on, is drastically reduced. I am quite convinced that by the abandonment of the use of the locomotive running on rails for the wasteful and expensive feeder services, and using the "metals" for the movement of full train loads at high speeds between concentration centres fed and tapped by road, there would be vast savings of raw materials of all descriptions, and better employment of labour. Such savings, in my calculations, take account of the costs of feeder services by road and of the road transport situation as a whole.

Indeed, I go so far as to say that integrated operations based on these principles would be able to stand up to the full blast of perfectly free competition by road or any other means, and the present system, neither completely monopolistic nor perfectly free, would give place to a rational one, more suited to the psychology of an adventurous people like ourselves.

There is nothing wrong with the railways except artificial restraints which for years have paralysed the spirit of workers and managements alike, and have become much worse since 1947 by reason of unrealistic organisation at high levels. We will never get anywhere until there is complete integration of all Executives in the field of traffic movement; this cannot be divided into separate compartments.

Yours faithfully,
FREDERICK SMITH

65, Hallowell Road, Northwood

THE SCRAP HEAP

Station Announcing on Trains

Why cannot there be a loudspeaker system on trains to announce the names of stations? In winter one has to try to catch a quick glimpse of the station nameboards—mostly in semi-darkness—or simply just trust to luck to know where one is.—*From a letter to "The Evening News."*

A Meal Wanted

In *Notre Métier*, the staff organ of the French National Railways, M. Vauquesal Papin describes how once, shortly before 1914, the British G.P.O. escort of the "Indian Mail" between Calais and Marseilles expected his usual meal to be brought out to the train from the buffet at Dijon. When it did not appear, he repeatedly asked, being ignorant of French, a waiter on the platform for "a meal." The waiter, also equally ignorant of English, repeatedly answered "Emile, oui, c'est moi!"

Traffic Delay

One of the busiest coast trains was due to leave in about two minutes and many intending passengers were converging on the barrier where the tickets were being checked. Then a woman arrived and opened her zip-fastener bag and took out a handbag. She then opened the handbag and took out a purse, after which she opened the purse, searched for her ticket, and eventually found it. Impatient travellers crowded behind her, but she was not perturbed. She placed the ticket back in the purse, then put the purse into the handbag, and placed it in the larger bag, which she closed. Only then did she pass through the barrier. —*From "The Glasgow Herald."*

A Fig for Regions!

There can be no doubt that to people with any tinge of romance railways and railway journeys are eminently romantic things. The splendour that belonged to the old names, Great Northern, Great Western or what you please, is very far from having been transferred to the merely regional titles that have succeeded them. Thus there will be much sympathy, even from those who owe no Western allegiance, for the newly-formed West Country Writers' Association, whose Chairman is the venerable and illustrious Eden Philpotts. Their cry of the heart is: "Give us back our Great Western Railway." It will be remembered that when the Julian Calendar gave way to the Gregorian in the 18th century, a number of people, better conservatives perhaps than they were mathematicians, fomented riots with the battle-cry: "Give us back our eleven days." These modern rioters are surely much more reasonable. Without entering either upon comparisons or politics, it may be said that the glory of the Great Western with its memory of broad gauge, was second to none, and that no station gave home-going travellers a greater thrill than did Paddington. A fig for regions! May we not enjoy our sentimental journeys under their old and more beautiful names? — *From "Country Life."*

Stowaway

When passengers in a through carriage from Poland were about to disembark at Trieste Station they heard persistent muffled knocking over their heads. Porters brought a railway policeman, who heard a voice in the ceiling saying in English: "Let me out." Jemmies and hammers were fetched, and a sooty young man of twenty was pulled out. He had travelled for 60 hours in the space between the ceiling and the roof of the train, from Danzig to Trieste, with a hot-water bottle containing drinking water and a still uneaten sandwich because he was unable to move his arms.—*From "The Manchester Guardian."*

French Electrification Medal

The French National Railways have struck a medal to commemorate the inauguration of electric working between Paris and Dijon in October, 1950.

The wording on the obverse of the medal, both sides of which are reproduced above, refers to the great Rhône barrage at Génissiat, where the turbines will soon supply power for the haulage of all trains between Paris and Lyons.

The End of a Light Railway

The directors and six shareholders met recently to wind up the North Sunderland (Light) Railway Company—smallest railway in the world—which has one locomotive only. For 53 years this railway has operated a four-mile single-track line between Chathill and Seahouses and the train has carried 10,000 passengers a year. There has been only one accident and that was when two sheep strayed on the line.—*From the "Daily Mail."*

Last C.P.R. Spike

A brooch worn by Lady Strathcona at a recent party was a large diamond nail. It is a replica of the last spike driven to complete the Canadian Pacific Railway. A small piece of metal from the actual spike is set into the brooch. The only other one in existence is a smaller version owned by the Queen. During the war, the brooch was buried in Colonsay.—*From the "Evening Standard."*

Music While You Travel

First of all, music while you work; then the air hostess; and now the music stewardess. The last-mentioned has been created by the German Federal Railways and she starts her duties at the terminus and travels with some of the long-distance expresses. She works with a gramophone which discourses music through loud speakers before the train starts. This is rather a pleasant idea, and, though hardly as practical, will be regarded by some as more romantic than: "The train now standing at No. 13 platform is for Stranraer calling at Crewe, Preston, Wigan, Carlisle, and Newtownstewart." Joining a special coach attached to the train, the music stewardess plays records over a loud-speaker system, does running commentaries on the scenery, and emits a little local advertising matter.—*From the "Belfast News-Letter."*

To 10000 and 10001

(*A.B. replies to the verses in our June 29 issue*)

So nice to hear from you, dear twins,
Though over-burdened by the sins
That, most deplorably, seem rife
During a longish railway life,
I'd like it to be understood
I cherish no ingratitude.

Full marks for your efficiency,
But—nix on personality;
I doubt if many boys would scram
To see an animated tram!
I should be much surprised to find
Such warping of the youthful mind.

I asked *Britannia* if she
Would very kindly referee
In this dispute, and she replied
"What *is* a diesel?" Then she sighed:
"Don't ask me if they're up to snuff,
"Why—bless me—they can't even
puff!"

A. B.

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

CANADA

Gas-Turbine Locomotive

The Minister of Mines has intimated that Government-sponsored research on a coal-fire gas-turbine locomotive is continuing at McGill University, but no prototype has yet been built. The Government decided last year to subsidise the project to the extent of $125,000, and the Minister told the House of Commons that a successful design would mean reduced operating costs for the railways and a continuing market for Canadian coal.

C.N.R. to Take Over Quebec Line

A Bill authorising the Canadian National Railways to purchase the 30-mile line between Quebec and St. Joachim from the Quebec Railway Light & Power Company, has passed its first reading. The reported purchase price is about $750,000.

The C.N.R. already owns the lower part of the line from St. Joachim to Murray Bay and the purchase of the remainder has been persistently rumoured.

The Quebec Railway, Light & Power lines, built in 1890, serves the whole Beaupré coast, including the famous pilgrimage centre of Ste. Anne de Beaupré. It is also reported that the C.N.R. will extend the line beyond Murray Bay to Seven Islands to meet the needs of the great mining development taking place in that part of the North Shore.

New C.N.R. Line in Manitoba

The House of Commons has approved in principle the Bill of the Canadian National Railways for a 155-mile line to tap nickel-copper ore deposits in Manitoba. It will run from Sherridon to Lynn Lake, Manitoba, where Sherritt Gordon Mines Co. Ltd., is to conduct operations now carried out at Sherridon, where ore deposits have become exhausted.

The C.N.R. is to bear $10,000,000 of the $14,725,000 construction costs, and the Federal Government the remainder, as a measure to assist defence production. Under an agreement between the C.N.R. and the company, the line is to be completed by November 1, 1953. The company is to build a plant to produce 2,000 tons of ore concentrates a day at Lynn Lake and a plant at Edmonton to refine the ores by use of natural gas.

NEW ZEALAND

Further Charges Increase Likely

Losses this year in the working of the railways are expected to result in further increases in fares and freights. Last year, with the May increase in freights and fares, the Department expected a surplus of revenue over expenses amounting to approximately £560,000. Because of strikes and increased wages and other costs the actual surplus was only £5,790. This amount does not take into account any interest payment on capital investments of over £80,000,000.

The policy of the present Government is that users must pay for the railways, and to make the service pay the Department is left with no alternative but to increase fares and freights once more.

PAKISTAN

New N.W.R. Diesel Repair Shops

As announced in our June 8 issue, the Government has decided to order no more steam locomotives for the North Western Railway, and concentrate on diesel traction instead. In preparation for carrying out this policy, new repair shops for diesel-electric locomotives are to be built at Lahore and Karachi.

IRELAND

New Containers

Thirty new 284 cu. ft. capacity containers have been completed at Limerick wagon shops of C.I.E. They are painted grey outside and green inside, and two may be accommodated on one wagon.

Plans are in hand for the manufacture of fifty more containers at Inchicore. This order includes 25 large containers; the remainder are of a dual-purpose type.

Sleeper Stacking Machinery

Tests have been carried out by C.I.E. into the use of heavy machinery for stacking sleepers. A Priestman Cub Wolf excavator formerly used for discharging ashes was fitted with a 27 ft. 6 in. dragline jib enabling sleepers to be stacked to a height of 24 ft., an increase of 100 per cent. on previous stacking.

As a result of these successful experiments, the Board has decided to purchase a similar machine, but fitted with a 32 ft. dragline jib. It will be powered by a 4-cyl. diesel engine, and have caterpillar tracks.

FRANCE

Pre-Stressed Concrete Sleepers

In spite of a slightly higher production price, the National Railways are using large quantities of pre-stressed concrete sleepers. They are mass produced on the S.N.C.F.-Valette-Weinberg system, developed from a similar system, used for the overhead supports for the Paris-Lyons electrification.

The pre-stressed sleeper is being developed as it has the following technical and economic advantages: the elasticity of the fastenings; the possibility of welding rails in very long lengths; and the stability of the horizontal and vertical alignment. The standard type, designed for 30 tons axleloads, weighs approximately 330 lb. and consists of vibrated concrete with steel wire reinforcement to which a pre-stressing effect has been imparted.

A rubber pad is inserted between rail and sleeper and an elastic rail clip which can move in a groove left in the sleeper, is used. The clip is fixed by means of a sleeper screw which engages a metal fixture embedded in the concrete.

Cards for Cheap Business Travel

The S.N.C.F. has submitted to the Ministry of Public Works for approval a plan for allocating cards to firms, giving their employees the right to travel at half-fare when on business for the firm. The firms will also benefit by a reduction of 10 per cent. on the price of half-fare tickets for ten cards subscribed for, 15 per cent. for 20 cards, 24 per cent. for 100 cards and 30 per cent. for 200 cards.

BELGIUM

Diamond-Pattern Steel Truss Bridge

The National Railways have replaced a double-track bridge over the Canal du Centre at Nimy-Maisières, destroyed during the war, by a new and longer span (194 ft. 6 in.) steel truss span of "diamond pattern" double Warren type without verticals. The main truss girders have a theoretical height of 26 ft. and eight "diamond" bays of 23 ft. each. The chords are of the box girder type. The diamond pattern is repeated in the wind bracing at top and bottom chord level, so that the entire structure is extremely rigid, vertically as well as horizontally. Statically, the top and bottom halves of the main girders have been regarded as separate V-trusses, each carrying half the truss load.

SWEDEN

Roslagens Railway Nationalisation

The 2 ft. 11 in. gauge Stockholm-Roslagens Railway was taken over by the State Railways on July 1. The first section was electrified in 1895; 67 of the 202 route miles are now worked electrically. Extensive bus services are operated by subsidiaries.

SPAIN

Increased Tourist Traffic

The National Railways have decided to increase the services between Irún and Lisbon *via* Madrid and Valencia de Alcántara by some 40 per cent. to cope with greatly increased tourist traffic between countries north of the Spanish frontier and Portugal.

Electric Traction by Single-Phase Current at 50 Cycles—2*

Technical problems arising from the use of the system, and their solution

THE installation of the 50-cycle single-phase supply system, which promises great facilities for extending electric traction in France, raises certain technical problems. Difficulties arise as a result of supplying energy to the locomotive. This supply is obtained from the general high-tension network feeding the simplified substations, which contain only transformers supplying current to the catenaries. By adopting on these special lines a tension of 20/25 kV., it is possible to separate the substations by approximately 100 km. so that they can conveniently be situated near existing high-tension lines best suited for their installation.

The first difficulty is in substituting single-phase currents on a three-phase supply network. This entails unbalance between the phases of the network, and results in tension fluctuations and phase displacements which can cause awkward disturbances if the degree of unbalance is serious. These disturbances chiefly affect the lighting installations and reduce the lighting efficiency of the lamps when subjected to overvoltage or undervoltage. It is also the cause of parasitic losses in the generators connected to the network.

These difficulties could be avoided by taking precautions. First, the extent of the unbalance could be reduced by dividing the catenary into independent sections supplied by different phases. The disturbing effects could be reduced, usually efficiently, by a judicious choice of the high-tension supply points. The main object would be to connect the rotating machinery most susceptible to the absorption of parasitic currents (main power station compensators and power station alternators supplied with dampers, etc.) to the supply line of the network by channels of minimum impedance. Normally this condition could best be achieved by linking up to main power stations or to very high tension supply lines.

Finally, if necessary, it would be possible to install equalising apparatus in the substations, for example, by substituting for the ordinary transformers the Scott type of transformers which ensure a greatly improved distribution of three-phase currents when sections of line are supplied with similar single-phase loads through their two secondary windings.

The results of tests made, particularly those by the S.N.C.F. in the Baden district of Germany, enable it to be stated that the make-up of the French interconnecting network will permit single-phase traction to be fed without dangerous unbalance.

A further difficulty arose with fixed installations: serious disturbances were feared with alternating current traction at 50 cycles on the telecommunication lines running parallel to the tracks. This problem has been eliminated by the general programme to replace all overhead telephone lines by cable located along the roadside, this work being undertaken by the French post and telegraph authorities.

This question will now be considered with regard to its effect on rolling stock. This is the main problem in view of the difficulties of producing traction motors operating on single phase, 50 cycles. For single-phase and direct current the type of traction motor universally adopted is the series-wound commutator motor, whose power-speed characteristics are admirably suited to traction. An increase in speed corresponds with a reduction of torque, and *vice versa*. The speed therefore adapts itself automatically to the amount of current fed to the motor. It is also a robust motor which can carry heavy overloads.

Compared with direct-current motors the single-phase motors with commutators differ essentially in certain aspects, both in construction and in performance. The permissible voltage between the commutator segments on single-phase motors is lower than that of direct-current motors; therefore, given commutators of equal diameter, the output achievable in single-phase motors is smaller.

With alternating current, self-inductance entails a reduction of specific output. The self-inductance of the armature can, however, be neutralised by adequate compensation of the motor. That of the field-winding can be reduced by decreasing the size of the poles. Furthermore, the flux in single-phase motors is smaller, and the relative importance of the armature in relation to the field greater than with direct current.

Commutation Problem

The principal problem to overcome is commutation. With direct current it is comparatively simple. The change of direction of the current imposed on the portion of the winding undergoing commutation induces in this winding a dynamic electro-motive force, whose damaging effects on commutation are proportional to the speed and to the main current. This is rectified by fitting interpoles which produce a counter electro-motive force which cancels that previously mentioned.

The same phenomena are encountered with alternating current, but the situation is further complicated by the pulsations of the main alternating flux which induces in the coils a second electro-motive force which may be called static; it is similar to that which occurs in the secondary coil of a transformer. This static electro-motive force is proportional on the one hand to the frequency, and on the other hand to the flux intensity, that is, to the current.

The voltage between the segments will be the resultant of the two electro-motive forces, one dynamic and one static. These two forces are in quadrature and both depend on the current; one of them is also a function of the speed. This can be eliminated as with direct current by interpoles, but it is necessary to ensure the correct phasing of the interpole flux in relation to the current, which can be achieved by connecting a suitable resistance in parallel with the interpole windings. To ensure perfect commutation a different resistance value should be made to correspond with each speed, in practice impossible to achieve. Therefore one has to be content with a condition to suit the average running speed.

Naturally the more one diverges from this condition, the greater will be the voltage between the segments, and commutation will be correspondingly worse. It is probable that for considerable periods the speed will not vary greatly from the speed at which the motor has been adjusted to give the best commutation. Particularly when starting up it would be essential to arrange for high acceleration so that the zone of speeds corresponding to good commutation could be reached as quickly as possible.

Thus with single-phase current the definition of the working range depends not only on the heating characteristic of the motors (thermal consideration) as with direct current, but also on the commutation voltage which must not exceed a certain value (commutation consideration).

Today, because of the continual progress in the construction of single-phase traction motors, the commutation problem is considered to be completely solved for a frequency of $16\frac{2}{3}$ cycles per sec. For 50 cycles per sec. commutation phenomena are of the same nature but are of greater importance. Multiplying the frequency by three entails an increase of the static electro-motive force, which, we have seen, is proportional to it. This electro-motive force must be brought within its admissible limits by reducing the pole flux in proportion.

Thus, the design of these motors is entirely different with 50 cycles. Therefore to reach the same output, the necessity for reducing the pole flux leads to an induced voltage reduced to one-third at three times the current, which proportionately increases the size of the commutator. To obtain the same torque the number of poles must be trebled. The number of brush arms must also be trebled.

The result is a considerably heavier

* Part 1 appeared in our June 15 issue

motor than the 16⅔ cycle motor, involving more delicate construction, but its development is already advanced and promises very favourable results. Neither should it be forgotten that in spite of the inherent disadvantages of the single-phase motor, it also possesses its own particular advantages.

With direct current the motor must be adapted for the maximum supply voltage although the actual operating voltage is considerably less. Furthermore, as the voltage cannot be regulated, a series of resistances must be arranged for starting purposes which can only be loaded for limited periods, and it is necessary to operate on excitation to obtain a suitably wide range of speeds. Particularly at high speeds the output can be increased only by reducing excitation. The possibilities of this method of regulation are limited. The electrical equipment related to the elimination of resistances and to the reduction of excitation occasions a great complication which is one of the outstanding characteristics of direct-current machines.

On the other hand, with a series alternating current motor, regulation for the progressive range of speed can be effected simply by varying the voltage between zero and a maximum value, through suitable tappings on the transformer. The driver is thus able to rest his controls indefinitely on any one point. It is therefore possible for this motor to give its full output even at high speeds, and it will be possible to maintain its maximum output indefinitely.

Locomotive Construction

Bearing in mind the foregoing considerations, we indicate below the most practical solutions proposed for the construction of 50-cycle single-phase locomotives.

Two categories of locomotives exist: those which use single-phase current applied directly to the commutator of the traction motor, and those in which the single-phase current is first transformed by a converter group.

A locomotive of the first category, built in 1936, is in service on the Höllental line, in Baden, Germany. Two locomotives of the same type have been developed by the S.N.C.F.; one incorporates one traction motor per axle and the other a double traction motor per axle, which simplifies the solution of this problem. Both locomotives develop approximately 550 h.p. per axle.

The second category of machines which incorporates current conversion equipment can be considered in a different class. Here also precedents exist: (*a*) the Kando system which operates on the Budapest-Hegyeshalom line, in which the single-phase current is directly transformed by a rotary converter group into three-phase current, supplying the traction motors of the rotating field type; (*b*) the Krupp locomotive with converter based on the type at present in service on the Höllental line; and (*c*) two locomotives in service on the Höllental line in which the single-phase current is transformed to pseudo direct current by mercury arc rectifiers.

The S.N.C.F. is studying a locomotive fitted with a rotary group converting single phase to direct current. The voltage of the single-phase, 50-cycle current is first reduced by a transformer and thence supplies an asynchronous motor which drives direct-current generators. The traction motors are the ordinary direct-current type supplied by varying voltage which is best obtained by the simple method of varying the excitation of the generators. In spite of the double transformation of power, the weight of this locomotive does not greatly exceed the weight of the locomotive with direct-current motors.

For the moment the S.N.C.F. has limited its studies to these three types of locomotives (two with motors supplied directly and one with a converter group), but the locomotives fitted with rectifiers may well prove an interesting study in view of the technical developments achieved on mercury arc rectifiers and the new types which are being built.

The foregoing gives an incomplete picture of the technical problems which have been studied. In this necessarily brief description, however, it has been possible to enumerate the principal problems and give an overall view of the results achieved. One particular point merits special attention, the necessity, at least for some of the locomotives to be arranged for operation on alternating current and direct current, for use in stations on the borders of the 1,500-volt limiting zone. These stations will be "single current" type supply, to avoid disturbances arising from the presence of contact lines of two types.

Certain single-phase locomotives must therefore be able to operate at least at reduced speeds on 1,500 volts catenaries. This problem has been studied for the three prototype locomotives mentioned. The locomotive fitted with the converter group presents a simple solution, but for the locomotives fitted with single-phase direct-current motors, an auxiliary group must be considered, either direct to direct, or direct to single-phase 30 cycles with reduced output.

Conclusions

Electrification by means of industrial current is the most obvious method; in fact it has been sought by the technical authorities from the start.

Two main factors have obstructed the development of this type of electrification: the difficulty of supplying suitable locomotives, and the impossibility, so long as the general supply networks are insufficiently developed, of obtaining an assured supply of the necessary energy for the railways without overburdening the network. This explains why, whilst developing early electrification schemes, the railways were obliged to build both power stations and track and it also explains why there was no hesitation in making use of special current such as the 16⅔ cycles in certain countries.

Today these two obstacles have been removed. On one hand the progress which has been made in the development of alternate current traction (direct coupled traction motors rectifiers, rotary converter groups) has made it possible to build locomotives operating on industrial current. On the other hand, in a country like France, provided with a well-developed electrical distribution network, the construction of a special network becomes unnecessary because the railways can obtain their supply from the high tension supply lines of the national network, thus avoiding re-transformation of current.

It is therefore possible today to undertake industrial current electrification as follows:—

(1) The elimination of all high-tension supply lines built specially for the railways.

(2) By supplying electrical energy to the catenary by means of simplified transformers spaced out between 50 and 100 km.

(3) By making use of high tension supply line voltages—25,000 volts for example—as a result of which lightweight catenaries can be used.

Economies Effected

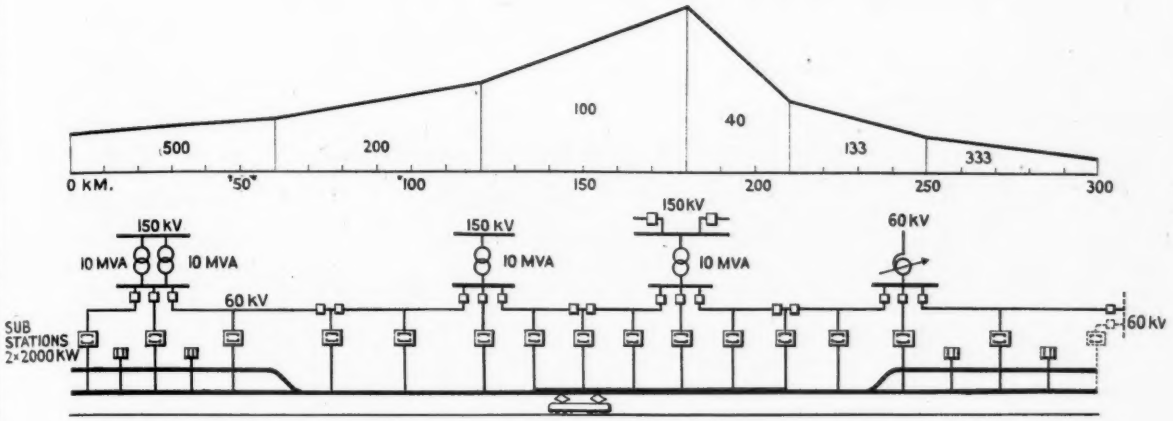
We feel justified in stating that the static installations will cost less than half that of similar installations at 1,500 volts; the economy on materials is even greater. As the work involved is also greatly simplified, the work can be undertaken by means of our own resources. Consequently electrification of the railways will no longer involve major works as hitherto, but will rank as normal development work.

The cost of single-phase locomotives should, in the future, be approximately equivalent to that of the 1,500 volts locomotives; the twin current locomotives will be a little more costly. This difference, however, can only reduce at most by 55 to 45 per cent. the economy realisable on the static installations. Taking into account the locomotives, the economy obtainable on materials for a particular section of line will be in the region of 45 per cent. on steel, 45 per cent. on cement and 65 per cent. on copper.

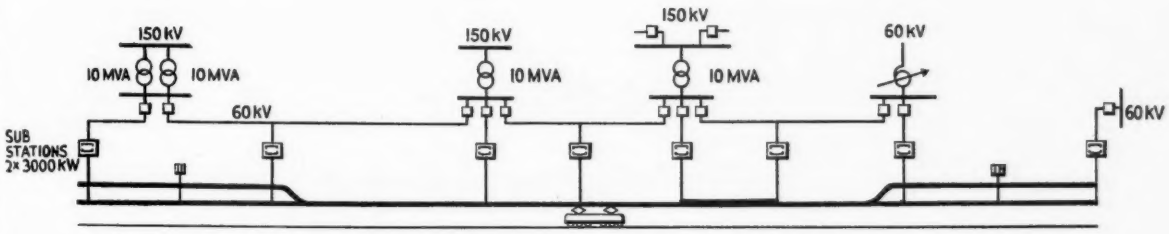
Thus, this new method of electrification will result in considerable economies both in materials and in expenditure, and these interesting recent technical developments can be exploited to the full.

(*Concluded*)

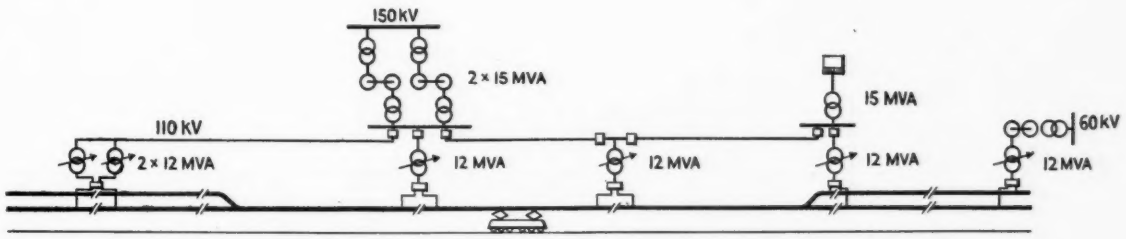
PLESSEY STATION (N.E.R.) CONVERTED TO HALT AND SIDING.—As from July 8 Plessey Station on the North Eastern Region has been converted to an unstaffed passenger halt and goods public delivery siding for full wagon load traffic. The only passenger trains now calling at Plessey are the 7.15 a.m. Newcastle to Berwick and the 7.29 a.m. Alnwick to Newcastle. Guards on these trains issue tickets to passengers to stations between Newcastle and Alnwick.



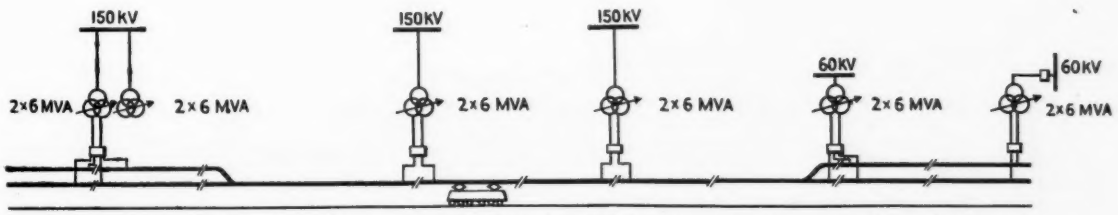
1,500 volts d.c. (French system) requires :—A high-tension electrified line (industrial three-phase 60,000 volts); 15 substations (small power stations to transform a.c. to d.c.); a heavy section copper catenary to cater for a heavy current (2,000 amp.)



3,000 volts d.c. (modern development of the 1,500-volt system, chiefly developed in Italy) requires :—The same high-tension line alongside the track, but as the current intensity is lower, there are fewer substations (8) and the catenary is lighter



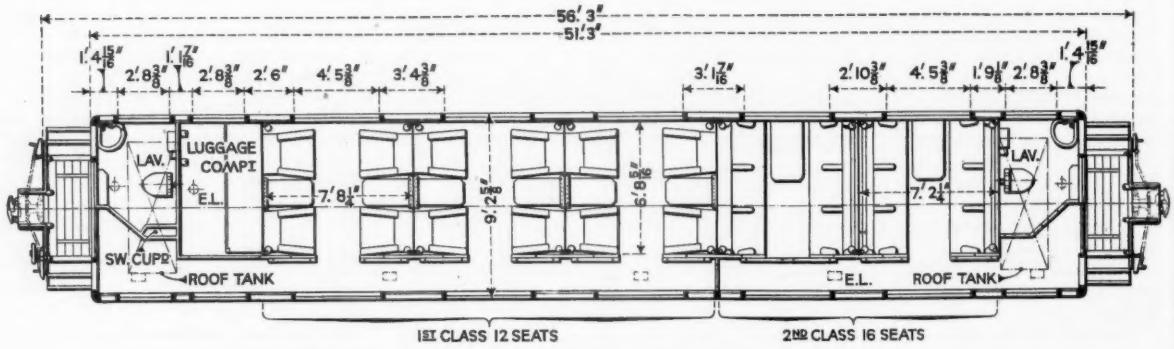
Single-phase, 15,000 volts, 16⅔ cycles (used in Switzerland, Sweden, and Germany) :—The voltage is high (15,000), current intensities are low, and the catenary and its supports are light, but it is still necessary to establish a high-tension line alongside the track (110,000 volts). This must be at 16⅔ cycles, which would have to be produced by three power houses (from the original industrial current) and transformed to the catenary voltage in five substations



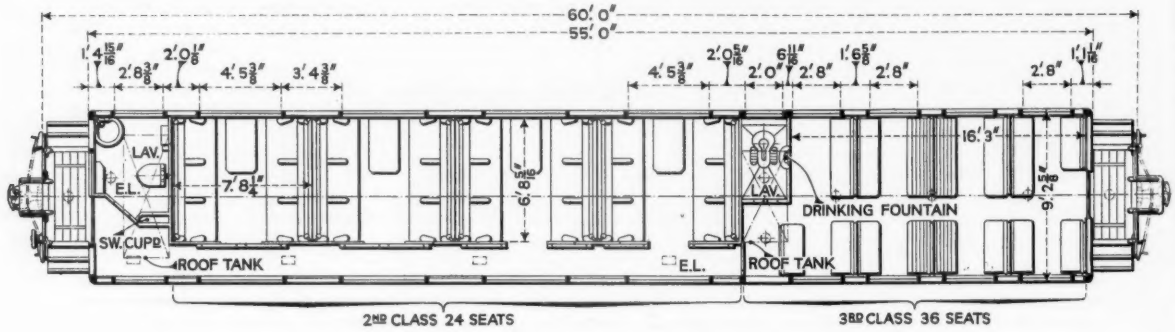
Single-phase, 20,000 volts, 50 cycles :—With a tension of 20,000 volts, which is made possible by recent technical developments, static plant is reduced to a minimum and includes a single lightweight catenary, fed from simple transformers placed at points along the track coinciding with the location of the ordinary electrical supply network (five stations)

Diagram of electrification of medium-traffic line (Clermont-Ferrand—Nimes, 300 km., of which 120 km. is double track) showing the comparative importance of static installations in relation to type of electrification used

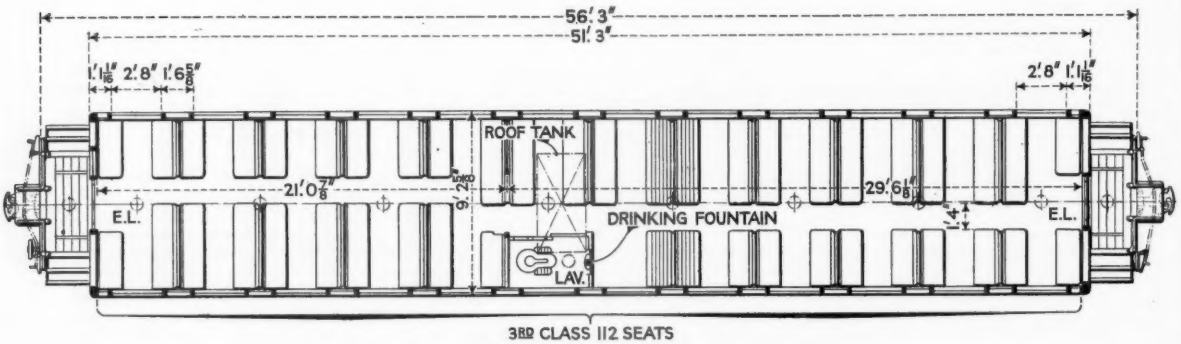
Rolling Stock for the Gold Coast Railway



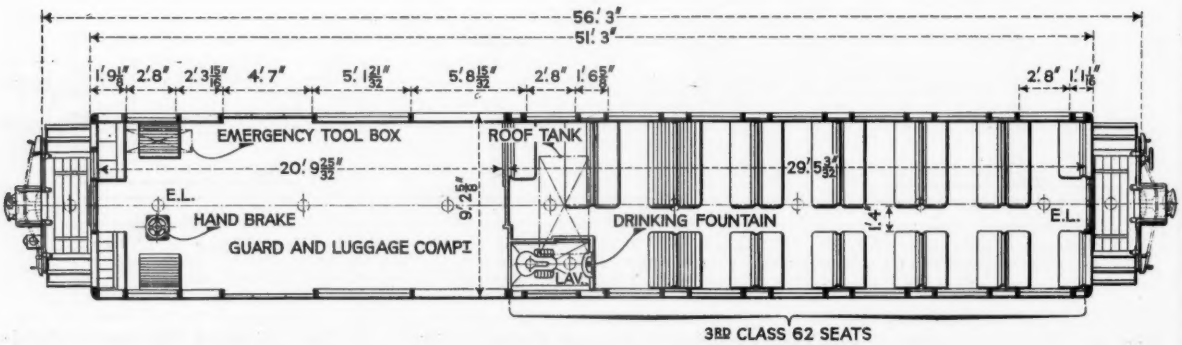
Upper class composite carriage showing seating arrangements



Layout of second and third class composite carriage



Seating accommodation of third class carriage



Plan showing arrangement of third class and brake compartments

Rolling Stock for the Gold Coast Railway

Underframes and bodies of integral construction and end open platforms

Interior view of third class coach

TO cope with increasing traffic on the Gold Coast Railway, the Crown Agents for the Colonies placed orders with the Gloucester Railway Carriage & Wagon Co. Ltd. for the supply of rolling stock comprising two first and second class composite coaches, five second and third class composite coaches, three third class passenger and brake coaches, and 20 third class coaches. The rolling stock, for the 3 ft. 6 in. gauge, has been supplied to the requirements of the Chief Mechanical Engineer, Gold Coast Railway, and to the specifications and inspection of the Crown Agents for the Colonies.

The underframes and bodies are of integral construction, the bodies being built as one unit, while the sub-assemblies consisting of underframe, body sides, ends and roofs are jig built and of riveted construction. The body side and end sheeting is secured to the framing by rivets; panel joints are welded to give a flush appearance.

The coaches are arranged with end open platforms and access is by means of fixed steps at the end of each coach. Sliding doors afford access to other coaches when coupled together, and hinged gangway platform plates and handrails are provided. Removable panels are arranged at each end to give access to the sliding door mechanism.

The bodies of all the new stock are of similar exterior appearance and construction, comprising principally rolled-steel sections, while the pillars are of rolled-steel angles. With the exception of the second and third class composite stock, the coaches are 56 ft. 3 in. over platform headstocks; the second and third class composite coaches have been increased to 60 ft. over platform headstocks.

Double carlines are used in the construction of the roofs, with longitudinal purlines. The roof sheets are of 16 s.w.g. mild-steel panels, while the body and end panels are 13 s.w.g. of similar quality; the inside surface of the body sheets is treated with a rust preventive coating.

The principal dimensions and weights of the rolling stock are as follow:—

Gauge	3 ft. 6 in.
Width over corner plates	9 ft. 2⅜ in.
Height rail level to top of carline	11 ft. 11⅛ in.
Length over platform headstocks:—	
First and second class composite carriages	56 ft. 3 in.
Second and third class composite carriages	60 ft.
Third class carriages	56 ft. 3 in.
Third class and brake carriages	56 ft. 3 in.

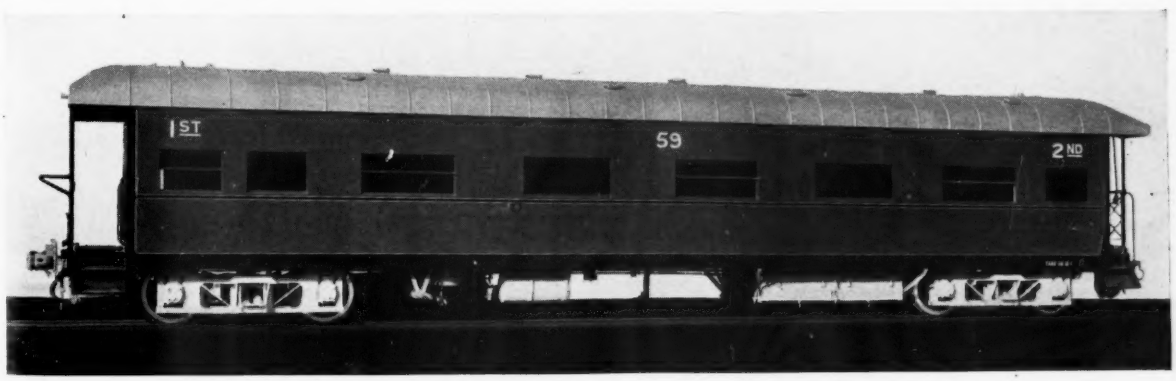
Weights:—	Tons	cwt.	qr.
First and second class composite carriages	28	12	1
Second and third class composite carriages	26	18	3
Third class carriages	24	2	1
Third class and brake carriages	25	5	1

Upper Class Composites

The first and second class composite coaches have seating accommodation for 12 first class and 16 second class passengers. The first class seats comprise Bouyant Tango easy chairs covered in brown leather; loose covers are also provided. Polished folding tables, which are locked against the partitions when not in use, are fitted between the chairs; these also are provided with loose covers. The cross seating in the second class compartments is of conventional design with Lace Webb spring filling covered in Vynide; hinged Dunlopillo arm rests are provided. The panelling in the corridor and first and second class compartments is of polished African mahogany. Ash trays, tumbler holders, and bottle openers are fitted in the compartments.

Lavatory accommodation is provided at both ends of the coaches, and fitted with towel and toilet racks and deodorant fittings. The water tanks are arranged for easy removal through the roof so as not to interfere with the interior finish.

The floors of the passenger compartments and corridor are finished with



Composite upper class stock for the Gold Coast Railway

Induroleum, the composition being laid on galvanised dovetail sheeting to a depth of ⅛ in. The galvanised sheeting has been treated with a primary coat of red lead, then a final coat of bitumastic paint, before laying the Induroleum as a precaution against corrosion. Reversible chenile carpets are fitted in the first class compartments, and spring type window blinds are fitted in both first and second class compartments. The Beclawat windows are of the lifting type with Teleflex control gear, the glazing being neutral tinted.

Second and Third Class Composites

The second and third class composite coaches are similar in exterior design, but are 3 ft. 9 in. longer over platform headstocks. The second class compartments have seating accommodation for 24 passengers and the interior finish is similar to that of the second class compartments in the upper class composite stock. Alpax louvres are fitted in the third class compartments, and a native latrine cast integrally with the Alpax floor is provided together with a drinking fountain supplied from a roof tank. Accommodation is arranged for 36 passengers; the seats are of timber slats. Air vents and Monarch ventilators are fitted.

The third class compartments are panelled above the waist-rail in Sundeala, ¼ in. thick, and finished in stone colour; the panelling below the waist is of Agasote, ⅛ in. thick, and finished in gorton brown, the ceilings are also of Sundeala, ¼ in. thick, finished in stipple white and held in position by aluminium mouldings. The third class compartment in the brake van and third class coaches is similar in design to the third class stock; seating for 62 passengers is however provided.

All vehicles are equipped with Stone's system of electric lighting, and are fitted with Kent couplings. The equipment includes Lilliput dynamos, type No. 4, and Alconum accumulator cells, the underframe electrical gear being concentrated at one point on a switch panel. All vehicles are fitted with Twinberrow bogies and British Timken roller bearing axleboxes. Mintex liners are fitted to the bogie centre pivots and side bearers. Vacuum brake gear is fitted, and includes G-D slack adjuster equipment. The Gold Coast Railway administration intend to convert existing stock to MCB couplers, and to meet the conditions during the transition period the knuckle couplers supplied by the English Steel Corporation Limited incorporates a hook on the top of the head cast integrally with it, and a transition casting on the front of the coupler. Screw couplings are used. The changeover will be on a programme basis, and will take several years.

Principal Contractors

The following is a list of contractors who supplied materials for the new stock:—

Lighting equipment ...	J. Stone & Co. Ltd.
Beclawat windows with Teleflex control gear	Beckett Laycock & Watkinson Limited
Windsor blinds, Sundeala and Agasote panels	G. D. Peters & Co. Ltd.
Air extractors	Monarch Controller Co. Ltd.
Metallic fittings and lavatory fittings	John Levick Limited
Widney door locks ...	Hallam Sleigh & Cheston Limited
Alpax louvres and floor castings	Lightalloys Limited
Tango Buoyant easy chairs	Buoyant Upholstery Co. Ltd.
Glass	Pilkington Bros. Ltd.
Seat spring filling	Lace Web Spring Co. Ltd.
Vynide	Imperial Chemical Industries Limited
Reversible carpets ...	John B. Champion & Sons Ltd.
Dunlopillo arm rests ...	Dunlop Rubber Co. Ltd.
Induroleum flooring ...	Docker Bros. Ltd.
Vitromant washbasins ...	Twyfords Limited
Roller bearing axleboxes...	British Timken Limited
Twinberrow bogies ...	G. H. Sheffield & Co. (Engineers) Ltd.
Vacuum brake equipment	Consolidated Brake & Engineering Co. Ltd.
G-D slack adjuster ...	Gresham & Craven Limited
Couplers	English Steel Corporation Limited

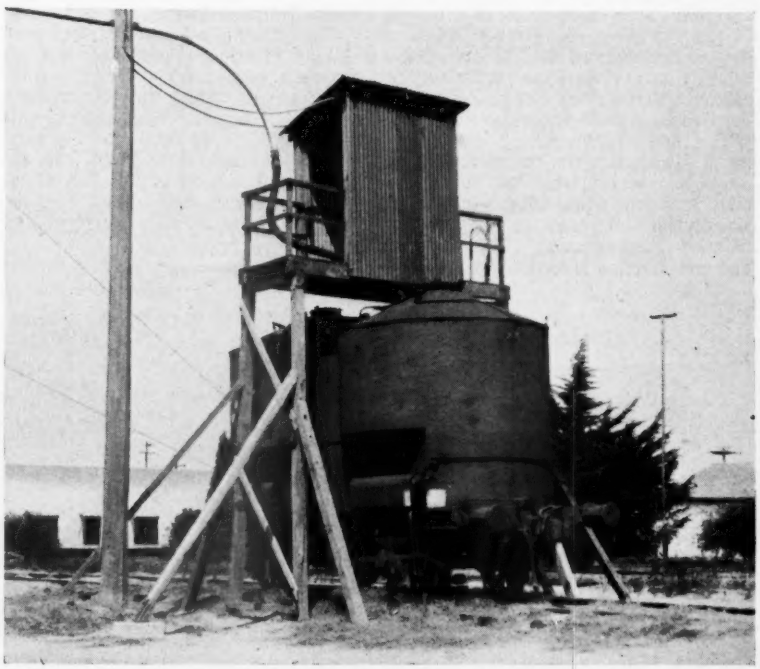
Pulverised Brown Coal Container Wagons

THE Victorian Railways are using special container wagons to convey pulverised brown coal from the point of manufacture at Yallourn to the North Melbourne Locomotive Depot. Experiments have been conducted for some time with brown coal dust as fuel for locomotives fitted with apparatus for the "Stug" method of firing. The container wagons, designated "CK" class, were constructed at Newport Workshops. They consist of two containers carried on a flat underframe and fitted with air and discharge pipes, for filling and discharging the fuel carried on the tender of the locomotives.

The containers are cylindrical with conical tops and bottoms. The upper ends are fitted with a filling door and the lower ends with a discharge pipe. A platform reached by a ladder bridges the two containers at the top and is fitted with handrails to provide a working space when fitting the filling tubes to the containers. Air pipes enter the top of the containers to provide air pressure at about 20 lb. per sq. in. when emptying.

The fuel is air pumped through an overhead pipeline across from the briquette factory at Yallourn to the loading point on a siding. The fuel is discharged from the bottom of the container by an air ejection system through a discharge valve into rubber hoses attached at their other ends to the locomotive tender.

Pulverised brown coal has the advantage of better control and the elimination of shovelling, grate cleaning, the spark hazard and the smoke nuisance. It also improves conditions in the cab. Its disadvantages are that these special wagons are necessary to transport the fuel and that special provision has to be made for handling and storing it. Tests were made with briquettes manufactured from brown coal as fuel for locomotives, but were not successful mainly because of the spark danger. As mentioned, a locomotive has been fitted with the special equipment necessary and the second "Stug" equipment is being fitted to an "N" class locomotive.

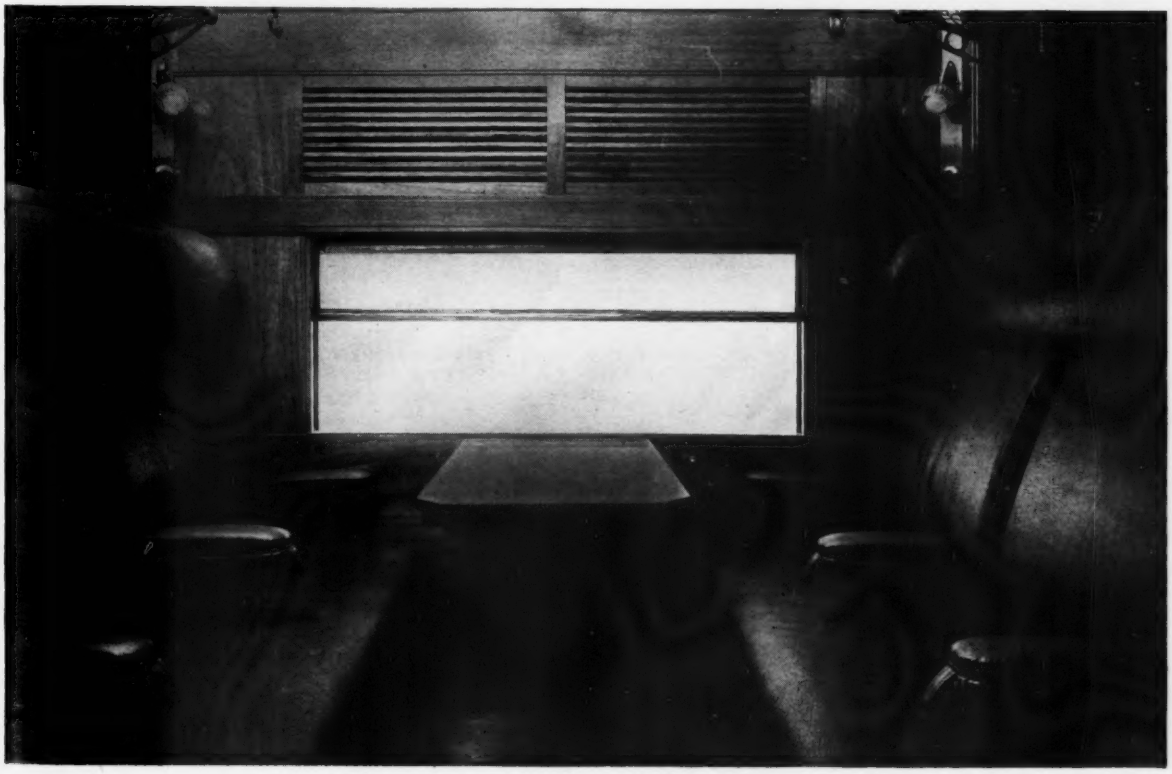


Container at loading point at Yallourn

Photo] [G. Bakewell

Rolling Stock for the Gold Coast Railway

First class seating arrangements showing collapsible tables and individual chairs



Seating arrangement of second class compartment

Travelling Cranes for Track Relaying, L.M.R.

Two diesel rail units working together can lay a mile of line a day with minimum obstruction to passing traffic

TEN diesel-electric rail travelling cranes for track relaying have been ordered by the London Midland Region of British Railways and the first seven of these are already in use. Two cranes working together can take up and relay a mile of line in one day. This development actually began in 1946, when the former L.M.S.R. started to lay 60-ft. lengths of pre-assembled track with 10-ton diesel cranes which had been in service since 1939, and also with 7-ton steam cranes.

Results obtained were very satisfactory and it was considered that if an appliance could be specially designed for this work there would be a considerable saving in time with consequent economy in operation. With this object in view an outline design of a diesel-electric rail travelling crane was formulated by Mr. H. G. Ivatt, Chief Mechanical Engineer, London Midland Region, and a specification was prepared for a crane which would be able to hoist 8½ tons at 15 ft. radius at 50 ft. per min. with the crane free on the track, falling to 2½ tons at 33 ft. radius at 110 ft. per min.

This crane had also to be capable of hoisting 8½ tons at 18 ft. radius, falling when blocked up to 3½ tons at 35 ft. radius, and to slew 8½ tons at a speed of 2 r.p.m. The full range of the jib had to be operated in or out in 30 sec. and the crane had to travel at 3 m.p.h. with an 8½ ton load and have sufficient power to climb a 1 in 40 gradient drawing three loaded wagons; also it had to be capable of travelling in train formation at speeds up to 45 m.p.h. and to negotiate four chain curves slowly.

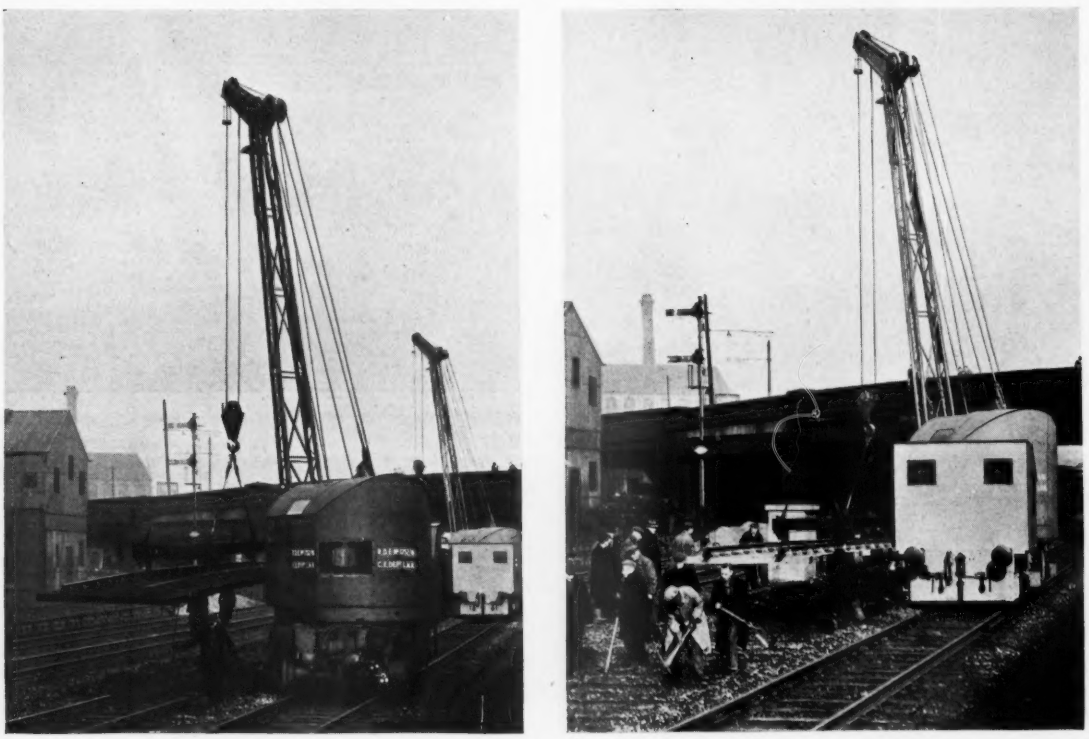
The axle load in train formation was limited to 17 tons and it was to have stability in accordance with B.S. class "B" requirements which had to be maintained on a 4 in. super-elevated track. An important factor was that the tail radius of the rotating superstructure was not to exceed 5 ft. so that the crane might operate with a minimum of obstruction to adjacent structures and to passing traffic. A contract for ten cranes was let to Taylor & Hubbard Limited at the end of 1947.

Because of the short tail radius it was found necessary to mount the engine/generator unit at one end of the crane undercarriage. This unit is designed to be removable as a whole although the housing also can be independently removed in one piece. The engine is a McLaren Ricardo Mark II three-cylinder diesel engine developing 82½ b.h.p. at 1,100 r.p.m. traction rating. Fram oil cleaners and Vokes air and fuel-oil filters are fitted as standard.

The engine is directly coupled to a Lancashire Dynamo & Crypto 280-V. 54 kW. compound-wound generator. The engine house also accommodates the cooling water radiator, main fuses, and a generator voltage regulator resistance. A 30-gal. fuel-oil tank is incorporated which, together with the radiator, can be filled by hand pumps from a 100-gal. fuel tank and a 60-gal. water tank respectively in the undercarriage of the crane.

The crane driving position is accommodated on the front left-hand side of the rotating superstructure, and attention has been paid to visibility from the cab, which has resulted in the driver obtaining a good view of the load at all times. Placed immediately in front of the driver are four De Renzi-Holmes cam contactor type controllers nested behind a substantial steel bulkhead to prevent possible damage from swinging loads. The usual controller operating crank handles are omitted, and a fore and aft lever movement *via* bell cranks and bevel quadrant has been substituted to bring the four upright levers for the hoist, slew, derrick, and travel motions directly in front of the driver.

The series-wound hoist, derrick, and slew motors in the superstructure drive their respective motions through totally enclosed David Brown worm reduction



Track relaying on the London Midland Region with specially designed diesel-electric cranes

units, the two former motions having a train of double helical machine cut gearing interposed between the worm units and the wire rope barrels. Electro-mechanical solenoid brakes are fitted to the hoist and derrick motions, and the hoist brake has hand release from the crane driving position. The slew and travel brakes are of the foot-operated band type.

A crane contactor panel is situated immediately behind the driver and provides full protection for all motors. Operation of all four crane motions simultaneously is possible, and to avoid overloading the engine a discriminating relay is fitted in the generator field circuit which on overload reduces the generator voltage, thus maintaining constant engine speed. The engine fuel-pump control is operated by lever gear from the driving position to the foot of the kingpost and thence by Arens control to the engine. The engine has two controlled speeds only, namely, idling and full.

A safe-load indicator of the B. & A. type is fitted in the derrick rope and gives visual and audible warning of overload for both free on rail and blocked up conditions. A colour-light (traffic light pattern sequence) panel is situated immediately in front of the driver and a further panel is mounted outside the superstructure at the extreme left front to give warning to men working at the load. This indicator operates from the 24-V. starter battery, though it is switched in by a small relay across the 280-V. generator circuit, which prevents the indicator lights being left on and thus draining the battery. In case the battery should become run down from any cause the engine is fitted with cartridge starting equipment.

Two 280-V. 500-W. tubular heaters are fitted at the driving position and electric horns give warning of travel movements. The whole of the crane structure is designed to pass through the Railway Clearing House Composite Loading Gauge No. 2.

The 37-ft. centres swan-neck jib is of tubular steel design. Assembly and welding has been carried out by Tubewrights Limited—which is a subsidiary of Stewarts and Lloyds Limited—and the jib foot is articulated to the crane superstructure to obviate swing-over of the jib when the crane travels round curves in train formation. Standard railway buffers and axleboxes are fitted and the carriage is train piped through for A.V.B. fitted working.

Sequence of Work

These new cranes are generally used 5½ days a week in unloading materials and assembling lengths of track. The cranes stack the complete lengths of track six deep on double-bogie bolster wagons, and by the Saturday the wagons and cranes are correctly marshalled with regard to the sequence required for the job in hand on the Sunday, when they go out in pairs to uplift the old and lay the new track.

The present programme calls for the laying in of roughly a mile of track each Sunday by one crane, the other being used to uplift and load the old track in front of that being laid in, both cranes working on the track adjacent to the one which is to be relaid. Trains of loaded trucks are shunted forward progressively over the relaid track and crane travel is in this way reduced to a minimum.

Although these cranes are primarily designed for track laying, they are of such capacity and proportions that they can be used without modification as general-purpose cranes equally with the earlier type of 10-ton diesel crane.

SCREMERSTON STATION: NORTH EASTERN REGION.—Scremerston Station in the North Eastern Region was closed for passenger and goods train traffic on July 8. The passenger and goods train traffic is being dealt with at Tweedmouth and there is a daily British Railways motor service for the collection and delivery of goods and parcels. Bus services are provided.

CABLE TRUNKING WITH FUSED TAP-OFF UNITS.—A cable trunking system which combines simplicity of installation with flexibility of distribution is being made by the General Electric Co. Ltd. for use in machine shops, and other shops where the total power consumption does not exceed 100 amp. per phase. Fused tap-off units can be fitted at any point from which connection has to be taken to a machine, so that even when changes are made in shop layout the units can be shifted and still be adjacent to the machines they control.

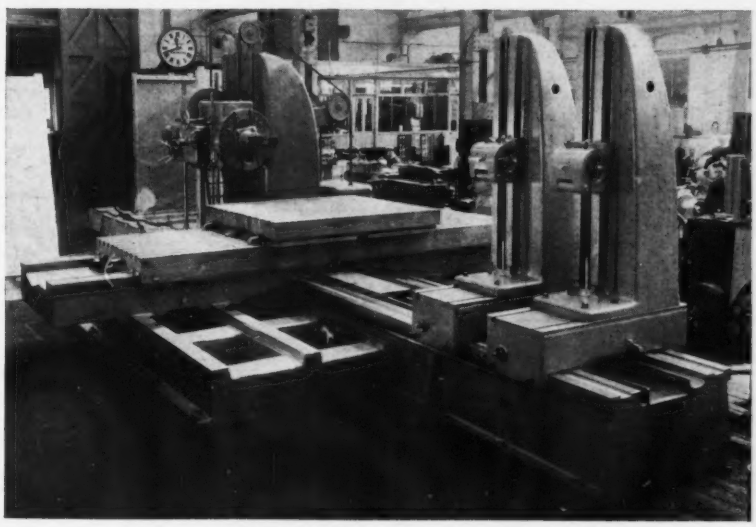
SPECIAL TRAINS FOR GLASGOW FAIR HOLIDAYS.—Over 100 long-distance special trains are leaving the four main stations in Glasgow this week. They will take holiday crowds to England and North Wales and also to Scottish resorts. In addition to the trains from the Glasgow main stations a special programme of direct services by-passing the city will be operated from many Glasgow district and Lanarkshire stations to destinations in Scotland and England. To speed the conveyance of luggage in advance a series of "luggage only" specials was arranged.

New Boring and Surfacing Machine

A BORING machine for dealing with a wide range of machining operations on large diesel-engine components and locomotive parts has recently been designed by H. W. Kearns & Co. Ltd. The machine, known as the Kearns patent horizontal surfacing and boring machine No. 5W.B., is intended for carrying out a number of operations including boring, surfacing, milling, drilling, and tapping.

The machine is fitted with a main table 5 ft. wide × 16 ft. long, and has a transverse traverse of 14 ft. 6 in., while the saddle has a total length of 20 ft. In order to reduce to a minimum the deflection of the table in a transverse direction the saddle is carried on a bed 15 ft. wide.

To ensure the parallel movement of this saddle in a longitudinal direction, and also to reduce the load on the feeding mechanism, the saddle is fitted with eight ball-bearing mounted rollers; these rollers run directly on the four outer bedway supports. A built-in facing chuck has a capacity up to a maximum of 54 in. dia., combined with a 6 in. dia. travelling spindle. The machine has a vertical traverse of 5 ft. and the maximum distance between facing slide and outer boring stay is 17 ft. 6 in. To give maximum support to long boring bars, two boring stays are provided, bored to take an 8 in. dia. boring bar. The machine is driven by a 25-h.p. motor and has a weight of 50 tons.



Kearns horizontal surfacing and boring machine

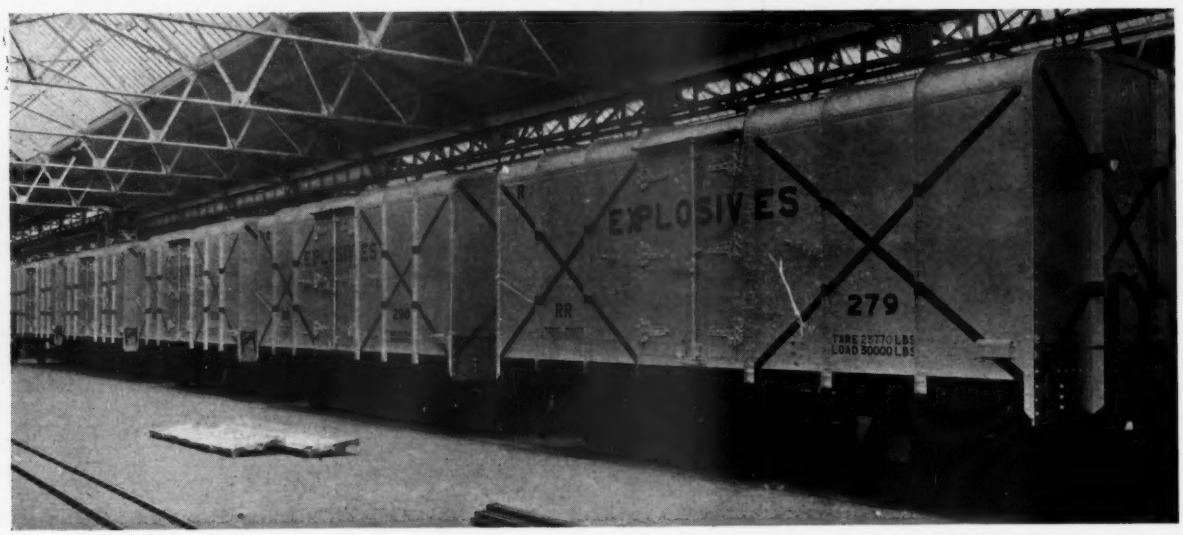
Wagons for Explosives Traffic, Rhodesia Railways

All-steel wagons fitted with angle pillars and continuous roof archrails

FOR special explosives traffic, mainly in connection with the mining industry, the Rhodesia Railways have introduced 25 all-steel four-wheel 3 ft. 6 in. gauge covered wagons with a carrying capacity of 30,000 lb. on an empty weight of 10·6 tons. They have solid-type wheels of 34 in. dia., spread over a wheelbase of 14 ft., and with standard plain axleboxes on journals 5½ in. dia. and 10 in. long. The underframe length is 22 ft. and the width inside the body 7 ft. 3 in.

The wagons, built by the Belgian firm of La Brugeoise et Nicaise & Delcuve, S.A. at its St. Michel-lez-Bruges works, are of riveted construction, with the underframe built up of four 10 in. by 3 in. by 19·28 lb. channels as the longitudinals, and with headstocks of 12 in. channels. The angle pillars and roof archrails of the body are of the continuous type, and positioned outside the body plates.

The outer panel and roof plates are $\frac{3}{32}$ in. thick and the inner panelling is of ¼ in. red deal; this thickness is doubled for the end panels. The deck is of $\frac{5}{16}$ in. steel plate, with 2 in. of cork between it and the upper floor of ¼-in. oak boards, with chequered brass plates at the 4-ft. doors. There is no insulation of the body sides and ends. The vacuum brake is applied through one 18-in. cylinder, with the usual side hand-lever brake in conjunction, and operates two blocks per wheel. The couplers are of the Atlas type with Spencer springs.



Finishing off in the paint shop a batch of all-steel explosives wagons for the Rhodesia Railways

SALVADOR RAILWAY.—For the year ended June 30, 1950, there was a net loss on the working of the Salvador Railway of £12,984, against a profit of £5,052 in the previous twelve months, increasing the debit balance forward to £75,903. The moratoria in respect of the debentures have been extended to February 29, 1952, and at request of trustees a revision of terms of supplemental trust deeds is being considered. Interest on 5 per cent. prior lien debentures for one year to August 31, 1938, was paid on September 1, 1950, and it is intended to make a further payment on September 1, 1951, in respect of year to August 31, 1939.

WESTERN WELSH OMNIBUS COMPANY.—Mr. J. S. Wills, Chairman, in proposing the adoption of the report and accounts at the annual general meeting of the Western Welsh Omnibus Co. Ltd., said that the revenue for the year showed a small reduction, traffic receipts being some £50,000 less than those for the previous twelve months. The number of passengers carried remained about the same at 92,000,000 and the milage run, 23,000,000, was 750,000 less. The major problem of peak period traffic showed no sign of abatement and they had to use substantial numbers of vehicles and staff solely for meeting that demand. Peak period operation would continue to be very expensive and largely unremunerative by reason of the fact that a considerable proportion of the services were workmen's services operated at fares well below the standard ordinary fare. There could be no doubt that these special fares were now an anachronism and their abolition was overdue. The interavailability of tickets between British Railways and the company had again been slightly extended and road and rail tickets were now interavailable for travel on 203 sections of routes.

CAMBRIDGE ROYAL SHOW TRANSPORT FACILITIES.—As a part of the comprehensive transport facilities arranged for the Royal Show at Cambridge which opened on July 3 a British Railways and British Road Services pavilion has been established in the grounds. Special cheap-day rail tickets are available to passengers from all stations within a radius of 80 miles. An important phase of the contribution made by British Railways was brought to a close by the opening of the show. Their first task was the delivery of 719 wagonloads of constructional material and 387 wagonloads of railway sleepers for roadways in the grounds. This material was delivered on site and the roadways laid by the end of April. Exhibition material, implements, and machinery then began to arrive, at first at a rate of 20 wagonloads a day, stepping up to an average of about 60 wagonloads a day. On June 26, despite bad weather, 150 wagons were cleared in the day. Altogether 800 wagonloads of exhibition and other material were dealt with from the beginning of June. Livestock movement arranged by British Railways amounted to over 80 vehicle loads. A special organisation covers terminal and showground transport operations.

SPECIAL TRAIN WITH AN UNUSUAL LOAD.—A special train with an unusual load left South Renfrew, Scottish Region, for Ellesmere Port, Cheshire, on July 1, and the journey will take three weeks. The train is carrying a depropaniser column—a cylindrical vessel used in connection with oil refining—weighing approximately 93 tons and 129 ft. in length; its diameter over protruding nozzles is 9 ft. 9 in. Because of the exceptional nature of the load it is being moved in stages. The first stage of the journey is from Renfrew to Carlisle, where it will be stabled for a week, then on to Carnforth, and, finally, from Carnforth to Ellesmere Port. The train will travel on Sundays and all movements will be carried out in daylight. Speed will not exceed 15 m.p.h. at any time and as a precautionary measure adjoining lines will be blocked against all classes of traffic,

RAILWAY NEWS SECTION

PERSONAL

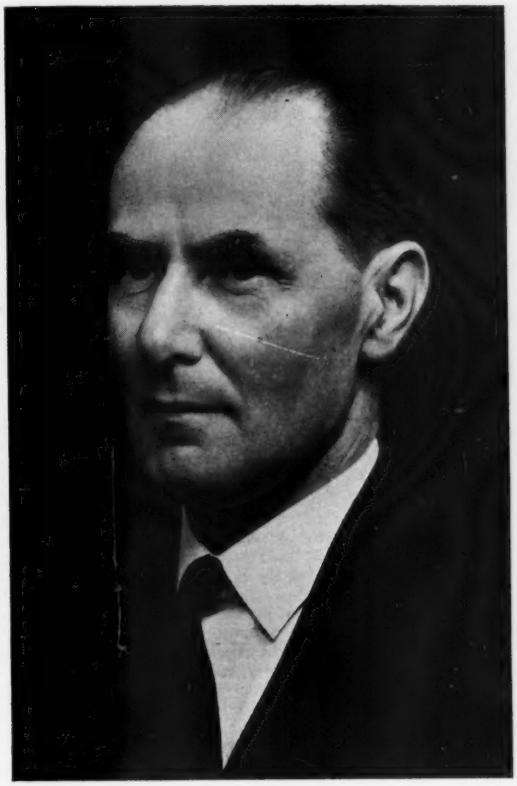
Sir E. A. S. Bell has retired from the board of the Barsi Light Railway Co. Ltd., and Sir Percival J. Griffiths has been appointed a Director.

Mr. S. B. Taylor, Deputy Secretary, British Transport Commission, who, as recorded in our June 29 issue, has been appointed Chief Secretary to the British Transport Commission with effect from July 1, is 50 years of age and entered the service of the Great Western Railway at the age of 15 as a clerk at Paddington. In 1921 he became a member of the Secretary's personal staff, and gradually progressed in the Secretary's Department until he became Acting Secretary of the company in 1947. Since December 1 of that year he has held the post of Deputy Secretary of the British Transport Commission. Mr. Taylor is a Bachelor of Commerce of the University of London and in 1928 was awarded by the University the Sir Ernest Cassel travelling scholarship, which enabled him to study for one year at Columbia University, New York City, and later by extensive travel in Canada and the United States to gain wide experience of the transport and business methods of that Continent. Mr. Taylor became an Associate of the Chartered Institute of Secretaries in 1926, and a Fellow in 1942. He was recently elected to the Council of that Institute. He has been an Associate Member of the Institute of Transport since 1933, and was for many years an Examiner to the Institute and a Member of the Examinations Committee. He is now a Member of the Council of the Institute. Mr. Taylor has always been interested in staff education and training, and during his career took an active part in the administration of many Great Western staff societies and of the Railway Students' Association. In the 1930s he lectured in transport subjects at evening classes and was Head of the Department of Transport of the Kennington Commercial (L.C.C.) Evening Institute, in which capacity he supervised the studies of many students preparing for examinations of the Institute of Transport.

Mr. C. T. Hutson, Assistant Superintendent of the Line, East African Railways & Harbours, is at present in Great Britain on leave.

We regret to record the death on July 3, at the age of 69, of Sir Theodore Thomas, C.B.E., M.Inst.T., General Manager of the London Passenger Transport Board, from 1943 to 1945. Sir Theodore (then Mr. T. E.) Thomas entered the drawing office of the London United Tramways Company in 1899, at a time when the horse tram services were being converted to electric traction, and subsequently was appointed Resident District Engineer. When control of the company passed to the Underground group, he transferred to publicity and commercial work for the group; in 1913 he became Commercial Assistant to Mr. Frank Pick and was responsible for fares, routes and other commercial matters arising out of the acquisition of the London General Omnibus Company. In 1917 he left the Underground group to become Development Superintendent of the L.C.C. Tramways, becoming Traffic Manager in 1925 and General Manager in 1930. On the establishment of the London Passenger Transport Board in July, 1933, he was appointed General Manager of the Board's tramways in the central, southern and eastern districts, and General Manager of the entire tram and trolleybus system in the following October. In 1936 he became responsible also for the operation of buses, with the title of General Manager (Road Transport), and three years later of railways, as well as road services, with the title of General Manager (Operation). Finally, in 1943, he was appointed General Manager of the Board, from which position he retired in 1945. Mr. Thomas was made a C.B.E. in 1941 for his work in connection with organising London's transport services early in the war and received a knighthood in 1946. He had held the Presidency of the Institute of Transport of which he was a foundation member and a Gold Medallist, and had been Chairman of the Public Transport Association.

The funeral of Sir Theodore Thomas



Mr. S. B. Taylor

Appointed Chief Secretary to the British Transport Commission

[Modern] [Transport

The late Sir Theodore Thomas

General Manager, London Passenger Transport Board, 1943-45

Mr. Archibald Campbell

Chief Mechanical Engineer, Office of Crown Agents for the Colonies, who has received the C.B.E.

Mr. D. S. Purdom

Who is relinquishing his position as Chief Mechanical Engineer, General Roca Railway, Argentina

Mr. W. O. Gay

Appointed Chief of Police, Eastern Area, British Transport Commission

took place on July 6 at the Downs Crematorium, Brighton. In addition to family mourners, those present included:—

London Transport Executive: Messrs. John Cliff, Deputy Chairman; A. H. Grainger, Member; P. Croom-Johnson, Chief Engineer; A. A. M. Durrant, Chief Mechanical Engineer (Road Services); J. R. Garwood, Divisional Superintendent; F. W. Clifton, General Secretary, London Transport (Central Tram & Trolleybus) Sports Association.

Also among those present were: Messrs. G. Cardwell, Chairman, and W. Vane Morland, Member, Road Passenger Executive; S. Kennedy, Chairman, Tilling Group of Companies; C. G. Page, formerly Secretary, London Transport Executive; G. H. Brooks, formerly Chief Staff Officer, London Passenger Transport Board; Mr. Elphick, Transport & General Workers' Union; Mr. J. Spencer Wills representing the Institute of Transport, of which he is President, the British Electric Traction Co. Ltd., of which he is Managing Director and the Public Transport Association Incorporated, of which he is a Member of Council.

Mr. Archibald Campbell, M.I.Mech.E., M.I.Loco.E., Chief Mechanical Engineer, Office of the Crown Agents for the Colonies, who received the C.B.E. in the King's Birthday Honours List, was born in 1891 and educated at Provanside School and Royal Techincal College, Glasgow. He served an apprenticeship with the North British Railway at Cowlairs from 1906 to 1911 and after completing his training in the drawing office, served with G. D. Peters & Co. Ltd. from 1912 to 1914, when he entered the Crown Agents for the Colonies Designs Department as Engineering Assistant. Between 1916-18 he served with the Royal Engineers and following his return to civil life was promoted Assistant Engineer with the Crown Agents in 1921, Deputy Chief Engineer (Mechanical) in 1935, and Chief Mechanical Engineer in 1948. Mr. Campbell visited Iraq in 1939 in connection with the design of locomotives and rolling stock for the Iraqi State Railways 4 ft. 8½ in. gauge section then being completed between Baiji and Tel-Kotchek. Between 1942-45 he was Liaison Officer for Colonial Railway supplies and equipment, attached to the Directorate of Transportation, War Office. He visited Canada and the U.S.A. in 1947 in connection with orders for locomotives, and went to Nigeria, the Gold Coast and Sierra Leone to study the railways in 1949. Mr. Campbell is a Vice-President of the Institution of Locomotive Engineers.

Mr. Douglas S. Purdom, M.I.Mech.E., who, as recorded in our July 6 issue, is relinquishing his position as Chief Mechanical Engineer, General Roca (former Buenos Ayres Great Southern) Railway, Argentina, to become Technical Director of Sul Americana Técnica Industrial e Comercial S.A., served his apprenticeship at the Cowlairs Works of the North British Railway, subsequently becoming Inspector of Materials for that railway. After three years experience as Assistant to the Managing Director of Bennets Iron Foundry Company, of Stockport, he joined the Buenos Ayres Great Southern Railway in 1924 as a technical assistant in the workshops at Remedios de Escalada. He became General Assistant to the Chief Mechanical Engineer in 1939, and Principal Assistant in 1947. In 1950 he became Chief Mechanical Engineer.

Mr. A. Comar Wilson has been elected a Director of Associated Electrical Industries Limited.

We regret to record the death on July 4 of Mr. F. R. Aldhous, M.B.E., General Manager, Meat Transport Organisation Limited. He had at one time been Assistant Manager to Mr. H. F. Minter of Hay's Wharf Cartage Co. Ltd., and at the outbreak of war was seconded to the Wholesale Meat & Provisions Transport Association Limited. This organisation was absorbed by the Ministry of Transport in 1940 as part of the Road Haulage Organisation and when the Road Haulage Organisation terminated became the Meat Transport Organisation Limited, with Mr. F. R. Aldhous as General Manager.

On July 4 the Directors of the British Vacuum Cleaner & Engineering Co. Ltd. held a reception and cocktail party at the Savoy Hotel, London, in celebration of the fiftieth anniversary of the invention of the vacuum cleaner by the Chairman of the company, Mr. H. Cecil Booth. The first application of the machine, it was stated, was for the removal of dust and litter from railway carriages.

Mr. W. O. Gay, Assistant Chief of Police, Eastern Area, Peterborough, British Transport Commission, who has been appointed Chief of Police, Eastern Area, was educated at Grays, Essex, and at Oxford University. He joined the G.W.R. Police at Paddington in 1936, served for a period in South Wales, was appointed sergeant in 1938, and soon after was selected for special wartime duties at headquarters. During the war he was a visiting lecturer at the Royal Corps of Military Police S.I.B. training centres. In 1945 he obtained the Grade A(1) qualification at the Home Office course for police instructors. In 1946, he was appointed Chief Inspector of the Northern Division, G.W.R. Police, and in 1949 Chief Inspector of the H.Q. Special Branch attached to the B.T.C. Police, Midland Area. In 1950 Mr. Gay was appointed Assistant Chief of Police, Eastern Area.

Mr. W. B. Baxter has retired from the board of the United Steel Cos. Ltd.

We regret to record the death on June 27 of Mr. H. C. Mills, Managing Director of the Morgan Crucible Co. Ltd.

Mr. W. F. Wegener, Chief Mechanical Engineer, Malayan Railway, is retiring from the Malayan Railway Service and will be leaving that country in August for Australia, where he will be taking up an appointment with the Commonwealth Engineering Co. Ltd., of Sydney.

The Brush Aboe Group of Companies has recently announced the following appointments: Mr. John Ayres, Works Director (Loughborough) of the Brush Electrical Engineering Co. Ltd., to be General Manager (local) of Petters Limited, at Staines; Mr. C. F. Barnard to be Assistant General Manager of the National Gas & Oil Engine Co. Ltd.; Mr. E. J. Batchelor, Managing Director of Brush Coachwork Limited, to be Vice-Chairman of that company; Mr. K. N. Eckhard, former Chief Electrical Engineer of the Central Argentine (now General Mitre) Railway, to be Director & General Manager of Brush Bagnall Traction Limited; Mr. B. D. Giordan to be General Manager of Mirrlees, Bickerton & Day, Limited.

British Transport Commission Results for 1950

Deficit reduced, revenue increased, and economies effected: Greater capital outlay and more flexible procedure for adjusting charges required

The third annual report of the British Transport Commission, submitted to the Minister of Transport by the Chairman, Lord Hurcomb, shows that for the year ended December 31, 1950, there was a deficit of £14·1 million, compared with the estimate of a £15 million deficit, and with that of £20·8 million for 1949. The deficit, the report states, might have been avoided altogether if the adjustments in charges eventually made had been authorised earlier. An application was submitted to the Minister of Transport on November 9, 1949, requesting that the special and temporary powers under the Transport Act be invoked for certain increases in railway, dock, and canal charges. By the end of the year 1949 the deficit of the Commission was running at the rate of £500,000 a week; but only on May 15, 1950, did an increase of 16⅔ per cent. in charges became effective. On a conservative reckoning the delay involved a loss of £11 million of railway and dock revenues. The extra fares needed (net) in the London Area were effective only from October 1, 1950, when the abolition of obsolescent tram services began, but the major rises in cost had occurred much earlier in the year. A loss of at least £500,000 is ascribed, in the report, to this, Road haulage suffered an increase in fuel duty and in purchase tax on vehicles, effective from April 18, 1950, but the charges made to customers were increased only gradually from May 19, 1950, onwards; there were also other delays in recouping the rising costs, and the consequent loss of road haulage revenue amounted to about £1,500,000. The bus groups similarly lost considerable sums for many months before fare increases could be obtained to offset the burdens of extra cost imposed upon them in common with other similar undertakings.

Despite these factors, which represent lost revenue of some £15 million, there was still a working surplus of £40 million towards meeting the central charges of £54 million. The central charges include £45 million for interest on British Transport stock, savings bank deposits, superannuation funds and other borrowings, and £2·6 million for the annual instalments in redemption of British Transport stock. They amount to less than one-tenth of the total expenditures, and have risen little over the three years; minor increases are attributable mainly to the interest on Transport stock issued to finance acquisitions of road transport undertakings.

Rapid Rise in Costs

In the closing months of 1950, the Commission's budget was almost in balance, but this was disturbed once more by a jump in transport costs, both rail and road, including increased rates of pay costing about £20 million in a full year. The opening months of 1951 will necessarily show heavy losses before the position can again be brought into balance; and this, when attained, will not recoup the total deficit of 39·6 million up to the end of 1950, or provide the margins essential to any healthy business enterprise. No part of the deficit, the report points out, has fallen on the general taxpayer. The accrued deficit of £39·6 million (which compares with a three-year turnover of £1,500 million) means that over the past three years transport users have received transport services at less than cost, and future users are left to make good the difference.

The principal carrying activities of the B.T.C. cost £489 million in 1950, or about 3½ per cent. of the gross national expenditure in 1951. The cost of passenger services represented only 2 per cent. of the total national expenditure on personal consumption. These figures are quoted in the report in view of statements that any increase in fares and charges is a prime factor in inflation. The rise in wages and prices outside transport, it is pointed out, has preceded, and caused, the increase in the cost of transport itself.

The main increases in cost levels over the three years, so far as they can be separately identified, were as follows:—

Effective date		Annual cost at then level of activity £ millions
1948		
Jan. 1	Increased price of coal	2·0
Feb. 1	Revised rates of pay for salaried, technical, conciliation and workshop staff of the Railway Executive	6·0
Feb. 2	Revised rates of pay for Road Haulage staff	0·1
March 1	Increased pay for road services staff of London Transport ...	1·6
March 1	Revised rates of pay for Hotels & Catering staff	0·7
April 1	Extra cost of granting annual leave during first year of service to conciliation grades of the Railway Executive	0·1
July 1	Improved rates of pay for railway police	0·1
July 5	Extension of National Insurance to all staff and increase in rates of contribution	3·5
July 19	Increased price of coal	1·8
Oct. 31	Revision of minimum Sunday duty payments to trainmen on British Railways	0·1
Various dates	Increased price of iron and steel ...	0·2
1949		
Feb. 26	Additional payment for Saturday afternoons to road staff of London Transport	0·4
March 4	Extension of annual holiday to 12 days for Road Haulage staff	0·1
June 5	Additional payment for Saturday afternoons to the road passenger staff of the Tilling and Scottish omnibus groups ...	0·2
Sep. 5	Payment in lieu of rest days and bank and public holidays (Railway and London Transport Executives)	0·5
Sep. 23	Increased rates of pay for Road Haulage staff	0·2
Nov. 1	Payment of weekly expense allowance to Railway district shopmen	0·1
Various dates	Increased price of iron and steel ...	1·0
1950		
Feb. 5	Revision of piecework prices for workshop staff of British Railways	0·2
April 18	Increased duty on petrol and fuel oil for road vehicles	5·7
May 1	Introduction of revised scales for Road Haulage salaried staff ...	0·3
Sep. 4	Increased rates for lower paid workers, mainly in the Railway Executive	1·1
Oct. 23	Revised rates of pay and cost of increased holidays for Road Haulage operating and maintenance staff	1·5
Nov.	Increased rates of pay for London Transport road and railway workshop staff	0·2
Dec. 22	Increased rates of pay for road passenger staff of Tilling and Scottish omnibus groups ...	1·3
Various dates	Increase in price of petrol and fuel oil	0·6
	Increased price of tin	0·3

The inadequacy of the expenditure permitted by Government to the Commission barely allows it to patch and maintain its existing apparatus. Arrangements were made to exclude the cost of permanent way repairs from the figures of "investment." After these adjustments, the "Economic Survey" for 1950 set out the expected rate of expenditure in the railway programme for the year as £81 millions, comprising £79 millions for railways and £2 millions for London Transport garages. The actual expenditure was just under £68 millions. The under-spending of the allocation was attributed to the following factors:—(i) The effect of imposing drastic restrictions in expenditure at short notice was to produce reductions in excess of what was desired; (ii) deliveries of rolling stock by contractors fell seriously behind; and (iii) owing to a formidable increase in estimated costs, it was decided to defer the extension of the Bakerloo Tube to Camberwell, on which work had started.

The "productivity" of British Railways since nationalisation has risen. This is shown in the major efficiency indices of British Railways which have continued to improve generally; staff has been reduced; and train-miles operated have increased by 7 per cent. The consequent reduction in the real cost per train-mile has been obscured by the rise in price levels of supplies, services and wages, but when these factors are eliminated by putting all expenditure on to present price levels, the cost per train-mile is seen to have declined since January 1, 1948, by the equivalent of 2s. a mile. If these improvements in efficiency and economy had not been effected, expenditures at the close of 1950 would have been running at some £35-£40 million a year higher than in fact they were. Improvements in the unit cost of output (after allowing for changing prices) occurred also in road transport, mainly due to replacing worn-out vehicles.

Regarding the future outlook, the report calls for the provision of finance on a large scale for replacement and development to avoid stagnation or even decay. This implies a more adequate allocation out of the total national investment programme. Finance must be provided on a large scale. The Commission now has over £200 million unexhausted borrowing powers.

The report also emphasises the need for greater willingness to accept changes, whether in conditions of work or in types of service or in proposals to integrate services. Costly delaying action on each proposal for re-organisation must be avoided. (During 1950, the Commission was faced with law-suits, appeals to the Consultative Committees, and constant propaganda, when even small changes were proposed.) Attempts to re-group operations, or to alter working conditions, met with considerable opposition from sections of the staff, which delayed integration and co-ordination of services.

Control of Rates and Fares

A scheme of public control over transport charges is needed, the report considers, which is both speedy and flexible. The B.T.C. almost alone among commercial organisations can normally increase its charges only after enquiries in the nature of litigation, which may be prolonged far beyond the date when the need for the increase becomes clear. Any organisation working under such limitations, the Com-

BRITISH TRANSPORT COMMISSION: CONSOLIDATED BALANCE SHEET AT DECEMBER 31, 1950

December 31, 1949		£	£	December 31, 1949		£	£
£				£			
	Current Liabilities				**Current Assets**		
	Creditors and accrued expenses (including £3,650,000 due to a Subsidiary Company)	56,041,638		67,816,374	Bank balances, deposits at short call, Tax Reserve Certificates and cash ...	40,440,833	
46,580,384					Marketable securities (Market value £70,218,288)	69,730,879	
	Consideration for undertakings acquired payable in cash (estimated)	9,361,299		92,120,148	Outstanding traffic accounts	52,156,840	
9,120,155				35,075,166	Other debtors and payments in advance	12,225,483	
	Interest (less income tax) accrued on capital liabilities	11,282,669		10,527,492	Stores and materials	70,439,380	
10,845,400				68,861,197			
8,087,485	Taxation	12,993,892					
				274,400,377			244,993,415
74,633,424			89,679,498				
	Deposits				**Investments in respect of British Transport Stock Redemption Fund Accounts** (market value £7,850,299)		7,768,776
43,797,158	By Staff Savings Banks	42,854,949		5,004,506			
72,147,528	By Staff Superannuation Funds ...	74,982,587					
					Interests in Non-Controlled Undertakings		10,029,384
115,944,686			117,837,536	9,810,843			
	Provisions				**Interests in Subsidiary Companies not engaged in the principal activities of the Commission** ...		2,441,068
113,318,509	For abnormal maintenance	101,489,351					
15,781,296	For restoration of war damage ...	15,304,626		2,693,349			
	For workmen's compensation and for compensation to officers and servants under the Railways Act, 1921, and the London Passenger Transport Act, 1933	2,833,494		48,915,621	**Net tangible assets employed in Road Haulage** (assets and liabilities consolidated in detail at December 31, 1950)		
3,458,955							
109,309,231	For pre-vesting actuarial deficiencies of guaranteed Superannuation Funds	108,629,904					
4,625,353	Internal Insurance Accounts	4,548,516			**Fixed Assets** on bases indicated in supporting Statements		
					(a) Rolling Stock, Vehicles, Ships, and Plant and Equipment	764,762,463	
246,493,344			232,805,891	672,966,807	*Deduct* Depreciation (including £332,501,080 deemed to have accrued prior to dates of vesting or acquisition)	403,774,015	
437,071,454			440,322,925				
						360,988,448	
	Capital Liabilities			363,454,105			
	Loan from London Electric Transport Finance Corporation Limited (repayable 1950/55)	40,160,040		309,512,702			
40,160,040					(b) Land, Buildings, Permanent Way, Docks, Canals and other works (*renewals of these assets are dealt with as revenue charges*)	980,371,706	
	Loan from Railway Finance Corporation Limited (part secured: to be repaid July 31, 1951)	27,000,000		959,597,329			
27,000,000							1,341,360,154
	Obligations to Local Authorities in respect of the redemption of loans ...	981,417		1,269,110,031			
1,033,422							
	Consideration for undertakings acquired to be satisfied by the issue of British Transport Stock (estimated)	12,165,292		48,884,184	**Goodwill**		60,279,546
14,693,653					**Discounts less premiums on issue of British Transport Stock,** less amounts written off		1,078,676
1,159,322,533	British Transport Stock	1,179,065,523		23,825			
					Net Revenue Account—balance (deficit) at December 31, 1950		39,577,369
1,242,209,648			1,259,372,272	25,494,057			
5,055,691	**Capital Redemption Accounts** ...		7,833,191				
	Note.—Estimated further expenditure on Capital Account authorised at December 31, 1950: £133,000,000.						
	HURCOMB, *Chairman* J. BENSTEAD, *Deputy Chairman* R. H. WILSON, *Comptroller*						
1,684,336,793			1,707,528,388	1,684,336,793			1,707,528,388

mission states, is bound in times of rising prices or falling traffics to be chronically in deficit.

New bases of charges, it is stated, are essential. When railways had a monopoly in fast transport, distribution of total costs over all users, roughly in proportion to their capacity to pay, was not unsuccessful. The arrival of road transport made this concept unworkable. In 1950, British Road Services carried about four-fifths as many tons of general merchandise (excluding coal and minerals) as did British Railways. Where the charge by road (which usually reflects the actual cost of the service given) is less than the approved railway charge, traffic will usually go by road; where the rail charge is less (and perhaps below the actual cost to the railway) traffic may go by rail. The remunerative traffic is lost to rail and the unremunerative remains. The Commission has consequently announced that it will propose railway rates which will take much greater account of the actual cost of different types of service, and what the competitive market will allow. The new Freight Charges Scheme which it is the aim to submit to the Transport Tribunal by August 6 next, has entailed a complete revision of the general classification of merchandise, and compilation of a gazetteer of chargeable distances based on road mileage.

Traffic Results

All passenger-carrying activities alike were affected during 1950 by a fall in the spendings of the public; freight services showed a marked resilience. Railway freight traffics remained at much the same level after the increase in charges. So far as can be judged in the light of available statistics, road freight traffics were also maintained at a high level, despite the rise in road haulage rates. On the

CONSOLIDATED WORKING RESULTS OF OTHER PRINCIPAL ACTIVITIES

	Docks, harbours, and wharves	Inland Waterways: other than carrying operations	Hotels and catering			Commercial advertising	Letting of sites, shops, etc., on premises and properties in use for transport purposes	Grand total
			Hotels	Refreshment rooms	Restaurant cars			
	£	£	£	£	£	£	£	£
Gross receipts	12,497,706	1,589,834	5,532,542	6,373,350	2,865,044	2,870,906	1,450,598	33,179,980
Working expenses (including depreciation or renewals but after deducting abnormal maintenance)	12,552,553	1,743,963	5,723,284	6,150,862	3,509,486	767,982	185,817	30,633,947
Net receipts	54,847 (deficit)	154,129 (deficit)	190,742 (deficit)	222,488	644,442 (deficit)	2,102,924	1,264,781	2,546,033
Year 1949								
Gross receipts	11,717,946	1,560,392	5,347,195	5,684,666	2,512,244	2,969,536	1,392,407	31,184,386
Working expenses	12,541,999	1,747,464	5,394,173	5,357,476	3,026,475	716,982	184,004	28,968,573
Net receipts	824,053 (deficit)	187,072 (deficit)	46,978 (deficit)	327,190	514,231 (deficit)	2,252,554	1,208,403	2,215,813

railways the number of originating passengers and the number of tons of freight handled were about the same as in 1949.

Gross passenger receipts in 1950 were £206·6 million, £5·2 million down on 1949. But for increased fares in the London Area, and on the provincial and Scottish buses, and but for an expansion in the bus fleets outside London from 12,305 to 14,068, the decrease in receipts (the report states) would have been greater by nearly £4,000,000. Poor weather affected passenger traffic considerably and petrol derationing had an important effect. The more important trend, however, was the unwillingness of the public to spend as much on travel as in previous years.

Passenger Fares

The report refers to the lowering of fares as an oft-quoted cure for declining passenger receipts. A minor reduction, it states, would have little effect. To reduce fares by one quarter would mean that the total volume of traffic must be increased by one third to retain the existing level of receipts, without taking into account the extra cost of carrying the increased traffic. Thus, any general lowering of fares would at present result in a considerable working loss. The Commission's policy however, is to reduce fares in carefully selected cases in order to stimulate profitable traffic.

Gross freight receipts rose to £305·9 million, reflecting the higher level of charges on substantially the same total volume of traffic. (Railway freight receipts rose by £22·8 million; the receipts of British Road Services cannot be compared with 1949, owing to acquisitions in 1949 which represented an increase in their fleets from 8,000 to 35,000 vehicles).

Whereas gross receipts from freight were generally buoyant, both by road and rail, and whereas passenger traffic tended to decline both by road and rail, net railway results improved, but net road results fell off. This is partly due to changes in 1950 in the relative working expenses. British Railways were able to introduce exceptional measures of economy. On the other hand, the provincial and Scottish buses were obliged to run additional services and, as in all road transport, their costs rose. The report emphasises that such changes in relative working costs do not necessarily indicate changes in relative efficiency.

Railway and Road Efficiency

As long as the external value of the pound had not been adjusted to its internal purchasing power, it is pointed out, imports of oil and rubber were relatively cheap. Moreover, the road vehicle having a shorter life, the ravages of war were made good much more quickly on road transport, and with more efficient vehicles. The road transport industry was thus able to continue long with fares little higher than pre-war and with relatively low freight charges, whereas railway fares and charges increased considerably. This was not due to a fundamental increase in the efficiency of road transport at the expense of rail, but largely to a temporary divergence of cost levels and load factors. These have now returned to something more like their pre-war relationship.

In the case of British Road Services, the report continues, it was impracticable to segregate normal trading expenditure from the expenses attributable to the reorganisation of the many undertakings involved. Development expenditure therefore had to be combined with ordinary revenue expenditure in the 1950 accounts. The volume of abnormal ex-

CONSOLIDATED WORKING RESULTS OF PRINCIPAL CARRYING ACTIVITIES

—	Railway passenger and freight services of British Railways		Collection and delivery and other road services of British Railways		Road haulage by British Road Services		Road passenger services of provincial and Scottish groups		London Transport services				Ships: passenger and cargo services of British Railways		Inland Waterways: carrying operations		Grand Total
									Road services		Railways						
	£	Per cent.	£	Per cent.	£	Per cent.	£	Per cent.	£	Per cent.	£	Per cent.	£	Per cent.	£	Per cent.	£
Gross receipts:																	
Passengers	106,611,489		—		—		—		41,316,234		14,689,379		5,582,210		—		206,593,942
Freight, parcels and mails	229,364,584		9,558,598		61,038,874		38,394,630		—		235,000		5,251,501		681,971		306,130,528
Miscellaneous	4,094,225		1,874		1,434,303		278,701		1,855		108,215		578,341		11,667		6,509,181
Total	340,070,298		9,560,472		62,473,177		38,673,331		41,318,089		15,032,594		11,412,052		693,638		519,233,651
Percentage of grand total—Year 1950 ...	66		2		12		7		8		3		2		—		100
Year 1949 ...	68		2		8		8		9		3		2		—		100
	£	Per cent.	£	Per cent.	£	Per cent.	£	Per cent.	£	Per cent.	£	Per cent.	£	Per cent.	£	Per cent.	£	Per cent.
Working expenses (including depreciation or renewals, but after deducting abnormal maintenance):																		
(a) Train, vehicle and ship operating costs ...	112,600,037	36	8,303,397	52	31,178,774	49	20,887,870	59	23,069,882	58	4,941,094	34	3,621,035	42	265,217	34	204,867,306	42
(b) Maintenance and depreciation of rolling stock and ships	65,781,133	21	4,009,561	25	16,234,464	26	8,126,526	23	8,053,654	20	2,568,541	18	1,665,895	20	153,692	19	106,593,466	22
(c) Other traffic costs	75,945,370	24	1,060,245	7	5,452,095	9	3,141,951	9	4,858,159	12	3,072,668	21	2,718,051	32	5,168	1	96,253,707
(d) Maintenance and renewal of way and structures	49,936,906	16	86,050	1	330,170	—	564,482	2	1,298,302	3	2,823,544	20	8,001	—	—	—	55,047,455
(e) Vehicle licence duties and inland waterway tolls	—	—	458,273	3	1,801,516	3	914,853	2	805,304	2	—	—	—	—	144,141	18	4,124,087
(f) General expenses	9,476,767	3	1,987,747	12	8,582,634	13	1,647,964	5	2,143,628	5	967,336	7	549,060	6	219,215	28	25,574,351
			15,905,273	100													492,460,372	100
Deduct:																		
(g) Cartage charged to other activities			3,569,387														3,569,387	
Total	313,740,213	100	12,335,886		63,579,653	100	35,283,646	100	40,228,929	100	14,373,183	100	8,562,042	100	787,433	100	488,890,985	
Net traffic receipts	26,330,085		2,775,414 (deficit)		1,106,476 (deficit)		3,389,685		1,089,160		659,411		2,850,010		93,795 (deficit)		30,342,666	
Operating ratio: percentage of working expenses to gross receipts	92		129		102		91		97		96		75		114		94	
Year 1949																		
Gross receipts	325,488,445		8,620,486		37,739,011		35,823,033		42,206,574		14,822,855		11,127,930		728,455		476,556,789
Working expenses	312,827,636		12,320,333		36,307,290		31,565,051		39,269,244		14,049,334		8,014,759		814,419		455,168,166
Net traffic receipts	12,660,809		3,699,847 (deficit)		1,431,721		4,257,982		2,937,230		773,521		3,113,171		85,964 (deficit)		21,388,623
Operating ratio: percentage of working expenses to gross receipts	96		143		96		88		93		95		72		112		96	

NOTE.—The classification of working expenses under the six main heads shown above, while broadly uniform, differs to some extent for the various principal activities shown

penditure is now falling off, and British Road Services are at present operating on a sounder financial basis.

Progress on British Railways

Despite rising costs of materials, wages, etc., the total expenditure of British Railways, at £313·7 million was only £900,000 more than in 1949. Controllable expenditure was down, with reduced expenses in Departmental, Headquarters and Regional administration (down £200,000), and in train working, (down £700,000). Greater care was taken of goods in transit and compensation for damage or loss of goods on British Railways was reduced by £423,000.

Since the summer of 1948, when the adjustments consequent on changing to the 44-hr. week were complete, successive staff reductions on British Railways (by 40,000, apart from unfilled vacancies) have brought the establishment to below the pre-war equivalent.

BRITISH RAILWAYS WORKING RESULTS, YEAR 1950

Year 1949 £		£
	Gross receipts :	
	Passenger train—	
	Passengers	
96,397,712	Ordinary	89,020,811
6,198,258	Early morning tickets and Workmen ...	6,185,272
11,366,762	Season	11,405,406
113,962,732		106,611,489
21,888,366	Parcels and other merchandise	23,048,291
6,897,781	Mails and parcels post ...	7,634,470
142,748,879		137,294,250
	Freight train—	
79,896,946	Merchandise	86,656,808
29,680,869	Minerals (Classes 1 to 6)	32,471,552
67,897,074	Coal and coke	77,684,545
1,466,802	Livestock	1,868,918
178,941,691		198,681,823
3,797,875	Miscellaneous	4,094,225
325,488,445	Total	340,070,298
	Working expenses (including depreciation or renewals but after deducting abnormal maintenance)—	
112,841,002	Train and vehicle operating costs	112,600,037
64,704,179	Maintenance and depreciation of rolling stock ...	65,781,133
76,092,174	Other traffic costs ...	75,945,370
49,658,333	Maintenance and renewal of way and structures ...	49,936,906
9,531,948	General expenses	9,476,767
312,827,636	Total	313,740,213
12,660,809	Net traffic receipts	26,330,085

Described as "perhaps the most important single statistic of efficiency for freight working," net ton-miles per total engine-hr. rose to 578, compared with 563 in 1949. The 1938 figure for the main line companies was 450. Net ton-miles rose by 125,000,000 in 1950 over 1949, to 22,135,000,000.

Docks and Harbours

Amongst other activities of the B.T.C., the main improvement occurred in docks, harbours, and wharves, where increased tonnages and higher charges are the chief explanation. In the face of changes in the pattern of the country's trade, great re-adjustments in the docks, physical and financial, will be called for. The report states that there are long, uneconomic stretches of inland waterway and the Commission is considering whether to seek powers to transfer certain canals to other authorities more concerned in their continuance.

In the case of the Hotels Executive, the report states, the difficulties were those common to the catering and allied trades. The increase in gross receipts in 1950 was more than offset by the increased cost of food and drink. The deficit on restaurant-car services was some £644,000, with gross receipts at £2,865,000. There was a profit of £327,000 on refreshments rooms, with a turnover of £6,000,000.

The net receipts from commercial advertising were steadier than might have been expected at one time, and the final results of £2·1 million must be regarded as a satisfactory addition to B.T.C. revenue. The net receipts from sites, and so on, on transport premises also made a useful contribution. Of the remaining sources of income, £1·6 million from non-controlled undertakings was less than 1949 by £100,000, and consists mainly of dividends from bus companies in the B.E.T. Group.

Integration and Co-ordination

Progress was made in the co-ordination of various activities of the Railway, Road Haulage, and Docks & Inland Waterways Executives. Questions relating to the conditions of service of the staff who may be affected by these integration proposals are to be dealt with between the Executives and the unions concerned through the agreed negotiating machinery. Unfortunately, the report adds, there is still a lack of appreciation in some quarters of the ultimate value of the increased efficiency which can be derived from integration and of the clear duty of the Commission to effect it under the Transport Act. No opportunity has been lost to emphasise that integration is vital to prosperity, and to overcome the difficulties inherent in the transitional period and to minimise hardship to individuals.

Examples of steps towards co-ordination between the Executives, taken during the year, include replacement by the Road Haulage Executive of unremunerative rail services, the common commercial service in East Anglia, joint rates offices, and combined road-and-rail passenger services and other facilities.

Staff Relations

The British Transport Joint Consultative Council met on five occasions in 1950 and paid particular attention to the question of integration of freight services. Other matters discussed included the reduction in capital expenditure on British Railways, Area Schemes for road passenger transport, and Charges Schemes.

In the second half of 1950 claims were submitted by the various unions seeking substantial wage increases for practically the whole of the 890,000 employees of the B.T.C. The estimated cost in a full year of all wages settlements and other important concessions granted or awarded to the staff with effect in 1950 was £5,000,000.

Despite the difficulties due to shortages and the unsatisfactory financial position, progress was achieved by the Executives during 1950 in improving the facilities available for the welfare of all grades. The Commission and the Executives maintained their efforts during 1950 to provide all members of the staff with full and regular information about their activities and the objects of the policies they were putting into operation.

Two numbers of "Transport News" were issued during 1950. The first, published in March, described the arrangements for joint consultation, and also new developments in education and welfare. The second number, in September, set out in popular form the principal items of interest in the B.T.C. report for 1949.

Staff & Labour Matters

N.U.R. Wage Claim

After considering in private session the report of a special committee on wages and conditions of service set up last March, the N.U.R. annual conference has decided to demand substantial wage increases for all staffs employed in nationalised transport.

It is also proposed to ask for increased lodging and meal allowances and payment for bank and public holidays. Requests will be made that the consideration of pensions for wages staff be speeded up. Representations will be made on behalf of road transport staff for increased pay for work on rest days and two weeks' holiday with pay. As a second part of its wages policy the union will demand the abolition of split duties, and more pay for night and Sunday duty, emergency turns, walking time, and dirty and dangerous work. It is understood these matters will be considered in conjunction with the A.S.L.E.F. and T.S.S.A. with a view to formulating joint demands to the Railway and other Executives concerned.

The conference also urged the Government to: enforce the strictest control of prices; control profits on essential commodities and ensure that increased profits are not obtained from rearmament; take immediate steps to secure lowering of distributive costs; remove purchase tax from non-luxury commodities; restore uniformity of benefits through National Insurance; and inaugurate machinery to increase world production and arrange for purchase and allocation of food and raw materials.

Railway Salaried Staff : Sick Pay

The Industrial Court published on June 21 its findings on the question of the right of the Railway Executive to take into consideration dependents' benefits in addition to the individual's personal benefit payable under the National Insurance Acts, 1946, when calculating payments to railway salaried staff absent owing to sickness. The matter was referred to the Industrial Court for settlement by the T.S.S.A. and the Railway Executive; the parties were heard on June 14.

It was submitted by the Association that having regard to the equal contributions paid by the employer and the employee towards the cost of sickness benefit, also the long established practice of the former railway companies of allowing sick pay without deduction, the Railway Executive have no right to take the whole of a married man's insurance benefit into account. During the course of negotiations with the Railway Executive on the matter the T.S.S.A. had agreed that the individual's personal benefit should be deducted from the sick pay allowance, but it could not accept that any deduction be made during the period of full sick pay on account of the benefits payable in respect of a wife, child, or other dependents.

Railway Executive View

On behalf of the Railway Executive it was stated that neither the former railway companies' practices in regard to payment during sickness, nor the standard arrangements introduced by the Railway Executive, form part of any agreement with the unions; payments to salaried staff during absence from duty owing to illness were made voluntarily by the directors of the former railway companies and such payments were liable to amendment from time to time or to be withdrawn at their discretion; such payments were not made as a condition of service.

It was not the Government intention

that the total payments to be made to an employee when temporarily unable to work should exceed his standard remuneration when at work and in these circumstances the Railway Executive considered it reasonable to deduct from full pay during a period of sickness the full statutory benefits payable under the Act. This in fact was a continuation of the former practice followed by the railway companies in the case of compulsorily insured staff. The arrangements introduced by the Railway Executive for the deduction of state benefit are the same as those which apply to the whole of the staff eligible for sick pay in B.T.C. undertakings; they are also similar to those applying to other nationalised industries, the Civil Service, and many major industries.

The Court after giving careful consideration to the evidence and submissions of the parties, stated it was unable to find any agreement the terms of which have deprived the Railway Executive of the right to take into consideration dependents' benefits in addition to the individual's personal benefit payable under the National Insurance Acts, 1946, when calculating payments to railway salaried staff absent owing to sickness. The Court awarded accordingly.

Railway Shopmen's Holidays

At the annual conference of the Amalgamated Engineering Union held at Brighton last week a resolution was passed which will lead to the executive council of the union pressing for payment for all statutory holidays for railway shopmen.

Railway shopmen get twelve days annual leave with pay and in addition payment is made for two of the bank or public holidays each year. At works where work is normally suspended on public holidays, men required to work are paid for all time worked at the rate of time-and-a-half (double time on Good Friday or Christmas Day). The selection of the days for this purpose is a matter for local agreement.

The guaranteed week for railway shopmen does not apply to weeks in which the works are closed at holiday times but such closing is restricted to the two weeks' annual holiday *plus* a maximum of seven days for public holidays, which may be reduced to six days by local agreement. In this respect the arrangements for railway shopmen differ from conciliation staff, as for the latter the guaranteed week includes public holidays. The shopmen contend that they are the only railway workers who do not receive remuneration for all statutory holidays.

Parliamentary Notes

British Railways Public Relations

Mr. W. F. Deedes (Ashford—C.) on the motion for the adjournment of the House of Commons on June 22 raised the subject of the relations of British Railways with the public. The Railway Executive, he said, tended to be frightened of allowing the breezes of constructive criticism to play, in moderation, about the set-up of the railways. In the end it would benefit the railways rather than otherwise if they encouraged from the public, from Members of Parliament, and from the press a little more constructive criticism and a more imaginative outlook. There was a different public relations set-up for each of the Executives; there seemed to be an extraordinary difficulty in achieving integration. If they were to have an integrated system of transport, public relations and advertising would be ordered accordingly.

He criticised lack of publicity of the road transport facilities replacing closed branch lines. Recent advertising by the Railway Executive did not inspire much confidence or public sympathy. The railways should make their facilities known so that the public could be encouraged to make the maximum use of them. In that the railways still had much to learn from the London Transport Executive.

Consultative Committees

The representation of railway users through the Consultative Committees was bad, and there should be a more conciliatory attitude in the railways' approach to local needs. Other points raised by Mr. Deedes included the right of occupation of first class accommodation, loudspeaker train announcements, the appearance of locomotives, and re-employment of railway pensioners.

The Minister of Transport, Mr. Alfred Barnes, agreed that there was much public misunderstanding, and irritation, but the public had not appreciated the special circumstances under which the railway administration had laboured since 1939. All the Consultative Committees were now in operation, and it was hoped they would be used effectively in future.

Regarding branch line closing, if there were any occasions when branch lines or stations were closed without full consultation, and if that was conveyed to him or to the Chairman of the B.T.C. the matter would be investigated. He did not think he could go into the legal problems of the rights of a first class passenger, but he had always understood unless one had booked and reserved a seat one had no legal right to a seat.

He was not aware that the Railway Executive were not using the services of retired staff whenever possible. The shortage of railwaymen was very uneven in the industry. It was not possible to move the staff about without causing much irritation and difficulty.

Questions in Parliament

Railway Lost Property

Mr. William Shepherd (Cheadle—C.) on June 25 asked the Minister of Transport if he would make regulations allowing rewards to railwaymen who returned lost property, for whom there was at present no reward.

Mr. Alfred Barnes: Present arrangements are of long standing and so far as I am aware have worked reasonably well. I see no sufficient reason to alter them.

Mr. Shepherd: If a railwayman has no chance of a reward when he finds lost property, and sees the lost property sold at public auction sales, he is not likely to return it.

Mr. Barnes: In the case of money, 50 per cent. of the value is returned, but "property" covers such a wide range that it presents a special difficulty.

Sir Ralph Glyn (Abingdon—C.): Is it not a reflection upon railwaymen to suggest that they should be rewarded for doing their duty?

Mr. Shepherd: Why does the Minister see a distinction between a reward for money and a reward for property, especially as property is now very much more valuable than when the regulations were framed, and money worth much less?

Mr. Barnes: There is really a great difference between the two when we consider the bulk of property which travels on the railways.

Contracts & Tenders

The Railway Executive has recently placed the following contracts as part of its 1952 wagon programme:—

Butterley Co. Ltd.: 300 21-ton mineral hopper wagons.

Cravens Railway Carriage & Wagon Co. Ltd.: 300 21-ton mineral hopper wagons.

Head, Wrightson & Co. Ltd.: 180 50-ton bogie rail, sleeper and ballast wagons.

Hurst, Nelson & Co. Ltd.: 300 21-ton mineral hopper wagons.

Metropolitan-Cammell Carriage & Wagon Co. Ltd.: 100 20-ton hopper ballast wagons; 250 30-ton bogie bolster wagons; 300 21-ton mineral hopper wagons.

Tees-Side Bridge & Engineering Works Limited: 62 50-ton bogie rail wagons.

The Paraguay Central Railway has recently placed a contract with the Yorkshire Engine Co. Ltd. for two 2-6-0 locomotives.

The Argentine Government has placed an order with the Metropolitan-Cammell Carriage & Wagon Co. Ltd., for 600 50-ton covered goods wagons.

The Sudan Government has recently placed the following contracts:—

Hurst, Nelson & Co. Ltd.: 25 bogie tank wagons.

Metropolitan-Cammell Carriage & Wagon Co. Ltd.: 200 30-ton steel bogie covered goods wagons.

British Railways, London Midland Region, have recently placed the following contracts:—

Harbour & General Works Limited, Westminster, S.W.1.: additional sidings at Basford Junction, near Nottingham.

D. Anderson & Son Ltd., Birmingham 1,: insulated steel roof decking to the warehouse roof and awnings, and felt coverings to the office block roof of the railhead depot for S.P.D. Limited at Liverpool, Brunswick Dock.

E. J. Logan (Putney Limited), London, S.W.15.: repairs and extension to warehouse No. 1 for accommodation for Carr & Co. Ltd., at Brompton & Fulham goods depot.

The Road Haulage Executive has recently placed a contract with Leyland Motors Limited for the following goods vehicles: 200 heavy-duty eight-wheel Octopus chassis and cabs, 50 Comet "90" cruiser-weight lorries, and 10 heavy-duty Beaver lorries.

The Wabash Railroad, U.S.A., has ordered 1,000 A.C.F. standard box cars, of 50-tons capacity, from the American Car & Foundry Company.

The Special Register Information Service of the Board of Trade recently stated that the British Embassy, Brussels, has reported a call for tenders by the Belgian State Railways, for the supply of accessories for permanent way. 150,000 line joining plates in 11 lots as per specification are required, and tenders should reach the Société Nationale des Chemins de fer Belges, Direction du Materiel et des Achats, Brussels, before July 18.

A copy of the tender documents (in French) is available for inspection by representatives of United Kingdom manufacturers at the Commercial Relations & Exports Department, Board of Trade, S.W.1. A second copy is available for loan to United Kingdom manufacturers in order of written application to the Department.

A further report from Brussels states that the Belgian State Railways have issued a call for tenders (No. 2652/172) for the supply of 12 lots of spring washers for

line connecting plates. As with the call for line joining plates, tenders should reach Brussels before July 18, and similar arrangements have been made for obtaining tender documents.

The British Embassy at Havana has reported that the Consolidated Railways of Cuba are considering purchasing rails and accessories from the United Kingdom, according to the Board of Trade Special Register Information Service. Interested United Kingdom manufacturers should communicate with the Consolidated Railways of Cuba, P.O. Box 170, Camaguey.

Notes and News

Vacancy for Works Manager.—A small railway locomotive workshops in Central Africa requires a works mechanical engineer (works manager) about 35 years of age. See Official Notices on page 55.

Vacancies for Civil Engineers on Rhodesia Railways.—Fully qualified civil engineers are required by the Rhodesia Railways for the Chief Engineer's Department. See Official Notices on page 55.

Conference Cruise of Naval Architects.—Fifty years ago the turbine steamer *King Edward* built by Wm. Denny & Bros. Ltd., ran her official trials in the Firth of Clyde. On July 3 this British Railways vessel was chartered by the International Conference of Naval Architects & Marine Engineers for an excursion from Glasgow down the river and round the Island of Bute. It is of interest to recall that the *King Edward* was the first passenger turbine steamer to be built and she is still operating with her original machinery.

British-Caprotti Valve Gear Exhibit.—The photograph reproduced below shows a working exhibit of a British-Caprotti valve gear displayed by Associated Locomotive Equipment Limited at the South Bank site of the Festival of Britain. The exhibit shows the poppet valves operated by the latest design of cambox and return crank gearbox for outside drive applications. With this arrangement all the working parts — totally enclosed — are readily accessible from the outside.

Steel Output in June.—Steel production in June was at an annual rate of 16,007,000 tons compared with 15,864,000 tons in May and 16,249,000 tons in June last year. The output of pig-iron was at an annual rate of 9,497,000 tons compared with 9,482,000 tons in May and 9,474,000 tons a year ago.

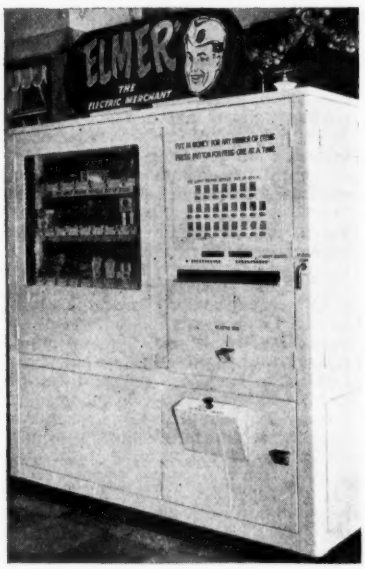
Production Engineer for Western Australian Railways.—Applications are invited by the Western Australian Government Railways for the position of Production Engineer in the office of the Chief Mechanical Engineer at the Midland Junction Workshops. See Official Notices on page 55.

Traffic Officer for British Guiana.—A Traffic Officer is required for the Transport & Harbour Department of the British Guiana Government for one tour of two years in the first instance. Candidates must be under 45 years of age. See Official Notices on page 55.

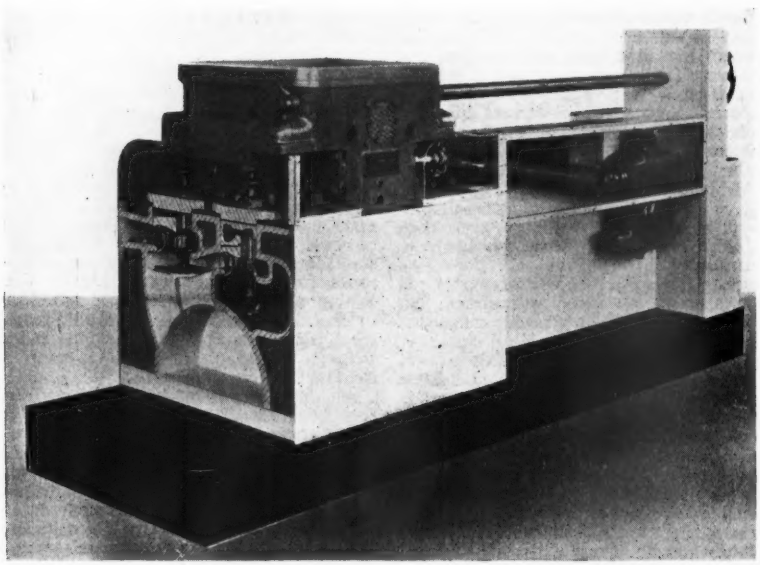
Associated British Engineering Limited.—A scrip bonus of one new ordinary 5s. unit for every five held is announced by Associated British Engineering Limited with the final dividend for the year to March 31. A final dividend of 12 per cent., making 20 per cent. on the capital of £250,000 as increased by a bonus of 25 per cent., is to be paid, as against a total of 16 per cent. on smaller capital. Profit, subject to taxation, is £98,017, against £91,225. Taxation and management expenses, etc., amount to £50,368, against £45,526, leaving a net profit of £47,649, against £45,699.

Transport for Orange Lodge Demonstration at Edinburgh.—Twenty specials were arranged by the Scottish Region of British Railways in connection with the Grand Orange Lodge demonstration in Edinburgh on July 7. Four trains started from Glasgow Central as well as two from Motherwell and two from Greenock; others were from Port Glasgow, Airdrie, Mossend, and Rutherglen, while a number left from Glasgow suburban stations. Fifteen of the specials arrived at Princes Street Station and five at Haymarket. On the Friday night about 1,000 Orangemen from Belfast crossed to Scotland by the short sea route from Larne to Stranraer on the *Princess Victoria*. Three special trains carried them early on the Saturday morning.

Self-Service Machine at Waterloo.—As announced in our July 6 issue, the Hotels Executive has installed experimentally in Waterloo Station buffet a self-service machine, called the Elmer Electric Merchant, developed and manufactured by the Australian firm of T. S. Skillman & Co. (Pty.) Ltd., Sydney, from whom it has been leased. The 25 articles available range in price from 2d. to 2s. 6d.



Automatic buffet at Waterloo



Working exhibit of a British-Caprotti valve gear shown at South Bank for the Festival of Britain (see paragraph above)

British Railways Coal and Steel Carryings.—During this weekend to July 9 British Railways cleared 210,580 tons of coal from deep-mined pits and open-cast sites; this made a total of 2,944,990 tons for the week. The latest figures for iron and steel show that 199,337 tons were conveyed during the week ending June 30 from the principal steel works.

Inquiry into Ulster Transport Authority Proposed.—The Northern Ireland Minister of Commerce announced on July 3 that he proposed to ask the Transport Tribunal to hold an inquiry into the authority of the Ulster Transport Authority. The rapid deterioration in public transport generally, and the deficits incurred had been the cause of considerable concern to the Government for some time, he said. Various and often conflicting criticisms of the Authority's policy and management had been frequently made. It was therefore desirable to establish, by impartial investigation, the causes of the difficulties that confronted the Authority so that the Government's future policy with regard to transport might be decided. A Bill, providing for the inquiry and for the engagement of persons who have special knowledge of some of the matters involved, will be introduced when Parliament meets later

OFFICIAL NOTICES

JUNIOR Traffic Officials with railway traffic apprenticeship experience. Age about 25, single, required for service on railways in Peru and Bolivia. Apply to the Secretary of THE PERUVIAN CORPORATION LIMITED, 144, Leadenhall Street, London, E.C.3.

DRAUGHTSMAN experienced in steam or diesel locomotive work required by works in N.E. England. Permanent position to suitable man. Pension Scheme, etc. Apply Box 133, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

APPLICATIONS are invited by a large Electrical Engineering firm for a design engineer experienced in the Electrical design of traction motors and generators. Opportunities exist to join expanding organisation with excellent conditions of service and prospects of promotion. Applicants should give full particulars of training and experience and state salary required. Box 146, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

GENTLEMAN, Oxford Degree Maths., returning to England, family reasons, at present employed by Dominion Railway as Technical Assistant in Chief Civil Engineer's Office, seeks position. Experience in drawing office and with Hallade, Proksima, etc. Present salary £600, but interesting and varied work first consideration. Correspondence in *R.G.* Age 38. —Box 154, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

THE Société Anonyme des Ateliers de Sécheron, Geneva, owners of British Patent No. 635,686 for "Improvements in or relating to Processes for the Manufacture of Welded Rail Joints without Turning the Rails and Welded Rail Joints Obtained by these Processes," are desirous of entering into negotiations for the Sale of the patent or for the grant of a Licence thereunder. By means of the patented process the space left between the ends of the rails is filled up with welding metal, in one or several operations. The strength of the welded rail joint so obtained exceeds that of a joint welded with the alumino-thermic process. These joints can readily be made by arc-welding without interruption of traffic and are in use on the Swiss Federal Railways. Inquiries to be addressed to CARPMAELS & RANSFORD, 24, Southampton Buildings, Chancery Lane, London, W.C.2.

THE PERUVIAN CORPORATION LIMITED.—Assistant to Chief of Traction, Peruvian Railways; age 26/35. Qualifications: Apprenticeship with steam locomotive builders or main-line railway workshops, main experience with a locomotive running department. Knowledge of diesel power an asset. Higher National Certificate for Mechanical Engineering or graduate of Institute of Mechanical Engineers. A knowledge of Spanish an advantage. Apply to the Secretary of the PERUVIAN CORPORATION LIMITED, 144, Leadenhall Street, London, E.C.3.

WESTERN AUSTRALIAN GOVERNMENT RAILWAYS

VACANCY FOR PRODUCTION ENGINEER

APPLICATIONS are invited for the position of Production Engineer, Midland Junction Workshops, in the Office of the Chief Mechanical Engineer. The position is classified in the grade of Engineer, Class I, with a salary range per annum of £1,069-£1,094-£1,119 (Australian currency) and, subject to satisfactory service, advancement in range is yearly. Applicants are required to be Associate Members of the Institute of Mechanical Engineers or hold a Degree in Engineering, and have experience in production work in large workshops. The duties include planning of production and progressing of work throughout workshops for new construction and repairs, estimating of shop loading and cost of projected works, maintenance of planning records and control of production office staff. A thorough knowledge of latest methods of production control, including tooling, gauging and inspection, is necessary. Free sea passage to Western Australia (subject to a maximum of £350 sterling) will be arranged for successful applicant, also dependants, and half pay allowed from departure from United Kingdom to arrival in Western Australia. Departmental medical examination must be passed before leaving United Kingdom. Housing accommodation in newly constructed modern Government rental houses will be arranged for married appointee with family. Applications (in duplicate) should be addressed to the AGENT GENERAL FOR WESTERN AUSTRALIA, Savoy House, 115, Strand, London, W.C.2, and reach him not later than August 3, 1951. Applications must be accompanied by copies of three testimonials as to character and include a clear and concise statement of age, nationality, dependants, academic qualifications and experience, particularly railway experience, also war service (if any).

CROWN AGENTS FOR THE COLONIES

TRAFFIC OFFICER required by the British Guiana Government for the Transport and Harbour Department for one tour of two years in the first instance. Salary £1,200 a year. Free passages. Liberal leave on full salary. Candidates, under 45, must be capable administrators and have a thorough knowledge of railway passenger and goods operating, including time tables, duty rosters, train control, rating, and transport law. Experience of marine transport an advantage. Preference given to candidates holding qualifications in the Institute of Transport. Apply at once by letter, stating age, full names in block letters and full particulars of qualifications and experience, and mentioning this paper, to the CROWN AGENTS FOR THE COLONIES, 4, Millbank, London, S.W.1, quoting M.27635.E on both letter and envelope. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration.

RHODESIA RAILWAYS

VACANCIES FOR CIVIL ENGINEERS

VACANCIES exist for fully qualified Civil Engineers for service in the Chief Engineer's Department of the Rhodesia Railways. Preferably single men under the age of 25 years will be considered, but married men not exceeding 30 years of age may apply. A degree in Civil Engineering is essential and/or corporate membership of the Institution of Civil Engineers. Salaries are enhanced by a variable cost-of-living allowance which is at present 10 per cent. of basic pay. The grades of Junior Engineer and Assistant Engineer have salary scales between the limits of £480 and £1,190 p.a. with increments of £36 p.a.; the commencing salary is in accordance with age and experience. Full particulars may be obtained from THE LONDON AGENT, RHODESIA RAILWAYS, 11, Old Jewry, London, E.C.2, to whom applications should be addressed.

WANTED: Three-headed Locomotive Frame Plate Slotter, bed length 50 ft.—Box 155, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

BOUND VOLUMES.—We can arrange for readers' copies to be bound in full cloth at a charge of 25s. per volume, post free. Send your copies to the SUBSCRIPTION DEPARTMENT, Tothill Press Limited, 33, Tothill Street, London, S.W.1.

APPLICATIONS are invited by a large Electrical Engineering firm for a draughtsman experienced in the mechanical design of traction motors and generators. Opportunities exist to join an expanding organisation with excellent conditions of service and prospects of promotion. Applicants should give full particulars of training and experience and state salary required. Box 147, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

WORKS MECHANICAL ENGINEER (Works Manager) required for small Railway Locomotive Workshops in Central Africa. Applicants must be thoroughly familiar with locomotive repair and maintenance, including boiler repairs and rebuilding. Age about 35, married man preferred. Salary £780 by £25 to £930; family allowance; free unfurnished quarters; free medical service; pension scheme; six months' leave on full pay every 3/3½ years, with passages paid. Write giving full details education, qualifications and experience to Box "M.M." c/o J. W. VICKERS & CO. LTD., 7/8, Great Winchester Street, London, E.C.2.

RAILWAY MAINTENANCE PROBLEMS. By H. A. Hull (late District Engineer, L.M.S.R.). Valuable information. With much sound advice upon the upkeep of permanent way. Cloth, 8¼ in. by 5¼ in. 82 pp. Diagrams. 5*s*. By post 5*s*. 3*d*. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

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this month. The report will be available "at the earliest moment" and will be presented to each House of Parliament.

British Railways Office in Piccadilly Circus.—Closed during the war the British Railways town office at Piccadilly Circus was reopened on July 9. Tickets and seat reservations and all information about travel on all Regions of British Railways are available.

Skefko Ball Bearing Co. Ltd.—The Skefko Ball Bearing Co. Ltd. has asked us to point out that due to an error in their advertisement in our last issue the photograph of the diesel-electric locomotive was incorrectly credited to the North British Locomotive Co. Ltd. instead of to the English Electric Co. Ltd.

Thornycroft Tractors at Basingstoke Exhibition.—An exhibition of local industries has been held at Basingstoke recently at which Transport Equipment (Thornycroft) Limited exhibited a Mighty Antar tractor and examples of Trident home and export vehicles and components.

Metropolitan Railway Surplus Lands Co. Ltd.—Sir Bernard Docker, Chairman, said at the recent annual general meeting of the Metropolitan Railway Surplus Lands Co. Ltd. that the net profit, before providing for taxation, was £153,954, to which was added the balance brought forward at March 31, 1950, of £43,568, making a total of £197,522. The charge for taxation absorbed £92,150, leaving £105,372, out of which it was proposed to pay, less income tax, a dividend of 3½ per cent. and a special bonus of 1 per cent., leaving £42,980 to be carried forward. As requested by a number of shareholders the board had fully considered the question of realisation of the properties of the company with a view to its liquidation. Their view was, however, that the company should continue to operate as a property investment company.

Southern Railway of India.—In a footnote to the editorial article in our July 6 issue entitled "Indian Main-Line Passenger Services" it was stated in error that the Nizam's State (N.S.) Railway had been absorbed into the Southern Railway. The third railway (with the Madras & Southern Mahratta and South Indian Railways) to be amalgamated into the Southern Railway was the Mysore State Railway; the N.S.R. is due for absorption (in the draft regrouping scheme) in the proposed Eastern Railway as described in an editorial article in our May 4 issue.

Level Crossing Abolition in Europe.—International experts of the United Nations Economic Commission for Europe have recently called for the abolition of level crossings, which, they said, caused many deaths in Europe. In a report to be sent to European Governments it was pointed out that more than 500 persons had been killed and more than 600 seriously injured in 1949 in 4,500 level-crossing accidents in fourteen Continental countries. Although it would be impracticable to remove all level crossings at once, the report urged that no new level crossings should be built and that crossings where traffic is heavy and visibility poor should be eliminated.

Sunday Train Service: Scottish Region.—As from July 8 a Sunday train service has been introduced between Glasgow and Milngavie and between Hamilton and Glasgow.

Tilley Lamp Co. Ltd.—A trading profit of £87,657, against £56,918, is recorded by the Tilley Lamp Co. Ltd. The company was made public two years ago. The net profit after all charges, including £36,600 for taxes, totalled £30,993. The interim dividend on the ordinary shares is 60 per cent., and the final dividend also is 60 per cent., making 120 per cent. for the year, against 100 per cent.

Appeal to Indian Railwaymen.—The Prime Minister of India has appealed to Indian railwaymen not to resort to a strike which would interfere with the transport of food grains to famine-stricken areas in the country. Assuring his Government's consideration of the workers' grievances, the Minister told them in a statement: "A strike at this critical juncture is sure to produce great injury and economic disruption." Nearly 300,000 railway workers led by the Socialist-controlled All-India Railwaymen's Federation, voted last month to

strike for increased living allowances. The Congress-sponsored Indian National Railwaymen's Union, claiming the loyalty of the rest of the workers, is opposed to the strike move.

Ackworth Station (N.E.R.) Closed to Regular Passenger Traffic.—The regular passenger train services at Ackworth, near Pontefract, on the York-Sheffield main line of the North Eastern Region were withdrawn as from July 2. Arrangements will continue to be made from time to time for dealing with schoolchildren at the beginning and end of term and also for excursion traffic.

U.S.A. Railways Income Increases.—According to the Association of American Railroads, the estimated net income for the principal American railways during May amounted to $50,000,000, an increase of ten millions from the same month last year. The carriers' net income for the five-month period ended May 31 rose to $197,000,000 against $133,000,000 in the same period last year.

Scottish Machine Tool Corporation Limited.—The directors of the Scottish Machine Tool Corporation Limited report a profit of £113,334 for the year ended March 31. This compares with £96,682 last year. Taxation takes £74,000. A final dividend of 5 per cent., with a bonus of 2 per cent., will be paid, making 10 per cent. for the twelve months. General reserve receives £10,000 and £46,728 is carried forward.

Southdown Motor Services Limited.—The report of the Southdown Motor Services Limited show a net profit of £259,788 for the year ended March 31. There was a balance of £204,639 brought forward from the previous year. After transferring £157,130 to general reserve there remains a balance of £307,297. The net profit of £259,788 shows a reduction of £217,422 on the previous year. After paying a dividend of 20 per cent. for the year, less income tax, and a bonus of 5 per cent., less tax, there remains £206,984 to be carried forward.

Rhodesia Railways Trust Limited.—The annual general meeting of the Rhodesia Railways Trust Limited was held in London on June 28. Sir Dougal O. Malcolm, Chairman, said the profit and loss account for the year ended September 30, 1950, showed that the gross income of the trust at £208,555 was £20,554 more than for the previous year, and that the net profit was increased by £9,061. It was decided to pay a dividend of 9 per cent. as compared with 8 per cent. for the last two years, and the balance of unappropriated profits carried forward is increased by £7,519. Since the close of the last financial year agreement has been reached for the sale to the Rhodesia Railways of the share capital of the Shabani Railway Company at £4 10s. a share.

Forthcoming Meetings

July 14 (*Sat.*).—Irish Railway Record Society, visit to the Cavan & Leitrim line of C.I.E.

July 21 (*Sat.*).—Permanent Way Institution, Manchester & Liverpool Section, visit to Stuart Street Power Station, Manchester, British Electricity Authority, at 2.30 p.m.

July 28 (*Sat.*).—British Railways, Southern Region, Lecture & Debating Society, ramble over the Surrey Iron Railway.

Railway Stock Market

Stock markets have been marking time and movements in most sections were again small. Industrial shares have been uncertain, largely because of the threat of steps by the Government to prevent higher dividends if increases continue to be announced. These threats mystify the City because Mr. Gaitskell stated earlier this year that he was not opposed to modest increases, and the higher payments have been with very few exceptions in line with moderation and restraint both in relation to earnings and in relation to the amount of net profits added to reserves. Taxation, which is by far the biggest beneficiary from higher profits, takes as much as 75 per cent. of earnings in some cases, while 50 per cent. or more of the remaining net profits are placed to reserves by most companies.

British Funds have lost their recent firmness and the tendency at the time of writing is to await the result of the £75,000,000 issue of 3½ per cent. Gas stock. This is the biggest gilt-edged issue for some time. It is argued that the authorities would not have decided to make it at this stage unless there were considered to be reasonable prospects of a steady trend continuing in the gilt-edged market. It is pointed out, however, that only £10 of the £98 issue price is payable on application, and that the final instalment is not due until December.

Foreign rails have been quiet, with no outstanding feature apart from buying of San Paulo 10s. units, which strengthened to 15s. 6d. It is being pointed out that a price of 20s. or more would be justified if the additional compensation claim has a reasonable and fair settlement; but that on the other hand it may be a long time before there is a final decision. Leopoldina stocks have been firm and brokers are advising clients that it would seem unwise to sell at this stage. Leopoldina ordinary were better at 10¼, the preference stock 27½, the 4 per cent. debentures 96½, and the 6½ per cent. debentures 143. Leopoldina Terminal 5 per cent. debentures were 95¼ and the ordinary units 1s. 3d. Mexican Central "A" rose to 59½ and National of Mexico 4½ per cent. non-assented moved up to 38½, demand finding the market short of stock. Bolivar "C" debentures have been firm at 67, and La Guaira ordinary stock at 87, with few sellers.

Canadian Pacifics were helped by the freight increase decision, but at 53¼ failed to hold best levels; the 4 per cent. preference stock was 72 and the 4 per cent. debentures 93. Manila "A" debentures at 75 and the preference shares at 7s. 6d. have been steady. Nitrate Rails kept at 23s. 6d. and Taltal at 17s. 9d. Antofagasta ordinary and preference at 10½ and 63¾ respectively were inclined to ease following publication of the annual report and the warning that a considerable increase in working expenses is probable. The preference stock, the dividend arrears on which date from 1941, may have interesting possibilities because from time to time some of these arrears will be paid off and eventually it may be found possible to devise a scheme for funding the balance of the arrears. United of Havana stocks receded, including the 1906 debentures at 16¼, following the statement by Mr. Morrison which confirms that Cuba is planning to nationalise the railway. The Cuban Government proposes to exchange views with interested parties. In the City there are no definite views of the terms that will be offered to stockholders; but it is pointed out that any fair and reasonable terms would have to be well above the current level of market prices, which have been depressed for a long time by the uncertainty prevailing regarding the future of the railway.

Road transport shares remained quiet with Southdown at 98s. 9d. xd., Lancashire Transport 61s., West Riding 52s., and Potteries Motor Traction 38s. 6d. B.E.T. deferred stock was £515 xd.

Engineering and kindred shares became much quieter, but Thorneycroft strengthened to 122s. 6d. on the second interim dividend, and Vickers firmed up to 51s. 9d. Among shares of locomotive builders and allied companies Hurst Nelson were 64s. and Birmingham Wagon 39s. 3d. Beyer Peacock strengthened to 33s. 6d., North British Locomotive were 18s. 9d., Gloucester Wagon 17s. 1½d., and Vulcan Foundry 30s. 4½d. T. W. Ward were 74s.; and, awaiting the financial results, Charles Roberts have been steady at 110s. Wagon Repairs 5s. shares kept at 15s. 7½d.

Traffic Table of Overseas and Foreign Railways

	Railway	Miles open	Week ended	Traffics for week: Total this year	Traffics for week: Inc. or dec. compared with 1949/50	No. of weeks	Aggregate traffics to date: Total 1950/51	Aggregate traffics to date: Increase or decrease
				£	£		£	£
South & Cen. America	Antofagasta ...	811	29.6.51	128,340	+ 64,750	26	2,977,320	+ 1,383,980
	Costa Rica ...	281	May, 1951	c566,653	– c467,774	47	c10,178,533	+ c694,685
	Dorada	70	May, 1951	35,183	– 6,442	21	177,217	– 30,174
	Inter. Ctl. Amer. ...	794	May, 1951	$1,274,448	+ $190,877	22	$5,898,678	– $16,121
	Paraguay Cent. ...	274	29.6.51	£304,390	+ £74,613	52	£11,108,897	+ £2,992,471
	Peru Corp. ...	1,050	June, 1951	S/ 533,000	+ S/ 1,650,000	52	S/ 92,754,000	+ S/ 21,536,942
	,, (Bolivian Section)	66	June, 1951	Bs. 15,967,000	+ Bs. 11900000	52	Bs. 160,349,000	+ Bs. 49,599,336
	Salvador	100	May, 1951	c138,000	+ c31,000	48	c1,867,000	+ c136,000
	Taltal	154	May, 1951	$2,256,051	+ $685,126	48	$18,869,332	+ $3,218,865
Canada	Canadian National†	23,473	May, 1951	17,653,000	+ 1,809,000	22	82,112,000	+ 12,717,000
	Canadian Pacific† ...	17,037	May, 1951	12,462,000	+ 1,788,000	22	56,846,000	+ 8,518,000
Various	Barsi Light* ...	167	May, 1951	32,460	+ 5,985	9	82,687	+ 22,425
	Egyptian Delta ...	607	10.4.51	17,513	– 267	4	17,513	– 267
	Gold Coast ...	536	Apr., 1951	293,464	+ 64,284	4	293,464	+ 64,284
	Mid. of W. Australia	277	Apr., 1951	41,036	+ 8,060	43	398,533	+ 89,683
	South Africa ...	13,347	9.6.51	1,963,472	+ 313,317	10	18,876,202	+ 3,314,638
	Victoria	4,744	Feb., 1951	1,739,845	– 87,111	35	—	—

* Receipts are calculated at 1s. 6d. to the rupee

† Calculated at $3 to £1